Scientific American.

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. XV.—No. 16. [NEW SERIES.] NEW YORK, OCTOBER 13, 1866. $3 per Annum, [IN ADVANCE.]

Sanitary House Warming.

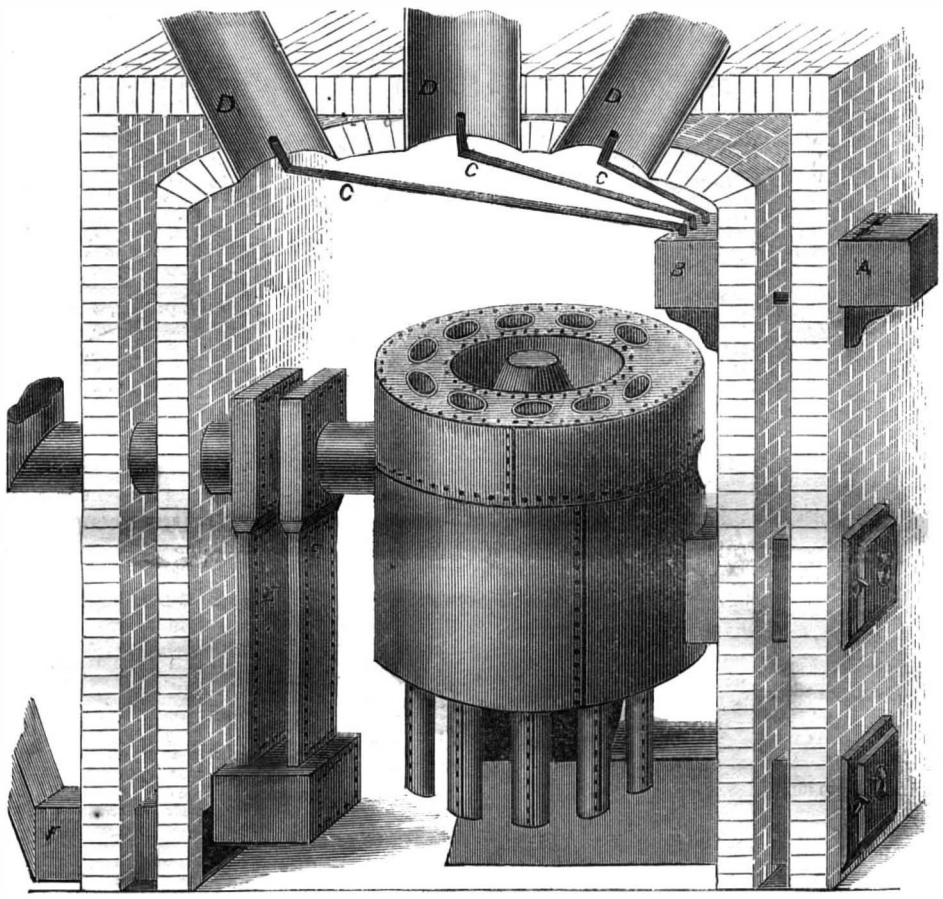
The quality of the air we breathe, and its influence upon health, are the first in importance of all the sanitary considerations to which the attention of mankind can be given. This will not be disputed when it is remembered that no man can live more than three minutes if wholly deprived of air, and that to maintain the blood in perfect purity, every person requires an average of eighteen pints every minute, which is equal to about sixty hogsheads full every twenty-four hours. If the air inhaled contains any impurity, or is in any degree deprived of its natural properties, an immediate evil effect is produced, and to no single circumstance is the great number of diseases by which mankind is afflicted, or the brevity of human life, especially of infants, more directly attributable, than to impurity of air.

One of the most active sources of foul air in modern dwellings is the method employed to obtain a proper temperature in cold weather. Very many of what are called modern improvements in the art of warming dwellings are believed to be prolific sources of sickness. The ordinary hot-air furnace is regarded by the best sanitarians as among the most frequent and potential sources of ill health, because of the impairment of the chemical qualities, and the deprivation of the natural moisture from the air as it passes through the furnace.

The engraving presented herewith represents the Whittingham Moist Warm air Furnace, which is constructed so as to obviate the objections incident to the use of the ordinary hot-air furnace. The heating surfaces in this furnace consist of heavy wrought-iron tubes, placed perpendicularly in a circle extending around and below the fire-pot, in such a manner that the heat from the surface of the burning coal reaches their exterior, and the air passing through the tubes receives caloric only from contact with their interior. This circle of tubes is inclosed in a cylinder, in the top of which is placed an inverted cone, all of which are made of heavy wrought iron.

A radiator, E, is also constructed for realizing the heat that would otherwise be lost in the chimney flue, so that about twenty thousand square inches of heating surface are obtained. Being constructed of wrought instead of cast iron, it is capable of being made perfectly tight without the use of packing or cement, and the risk of leakage from fracture, by expansion and contraction, or the mingling of the gases, from combustion, with the air in the chamber, is entirely avoided. Another desirable feature claimed by the inventor of this furnace, is the position of the water evaporator, B, placed in the upper part of the air chamber, and the vapor from it being conveyed by means of tubes, C, directly into the distributing air pipes, D. This evaporator is supplied with water from a reservoir, A, upon the outside.

This furnace, with its extensive heating surface, is able to warm a large volume of air to a temperate degree, instead of being compelled to heat a small volume to a high degree; and the water evaporation is taken, by means of the tubes, directly where it is required to supply the atmosphere with the moisture lost in passing through the furnace, thus rendering the air mild and pleasant.



THE "WHITTINGHAM" MOIST WARM-AIR FURNACE.

Patented through the Scientific American Patent Agency, by Harry Whittingham, and manufactured by Wm. H. Church & Co., 108 and 110 East 29th street, New York city, of whom further particulars may be obtained. They are also ready to dispose of rights for counties or States, and will furnish iron patterns complete.

THE USE OF TIME AND USELESSNESS OF HURRY.

Time was given man to use and not waste. It is for rational use and not foolish abuse. And at times it appears to the reflecting mind that we are mistaken in our endeavors to crowd into half an hour what should fill half a day. We do not refer to our habits of hurried eating, so frequently the subject of critics and lectures, but to the general hurry and haste that characterize every movement of our people. In traveling we give preference to the fastest lines, this being the grand recommendation of one competing line over another. The annihilation of space and time is a modern boast, as though the feat was really meritorious.

It is to be questioned whether this idea is a correct one. Human life is more valuable than a few hours or days, yet we risk life and limb in patronizing those conveyances which run the longest possible distances in the shortest possible time. The employes of railroad and steamboat companies have received the title of "baggage smashers," for no reason except that the rules of the companies and the exacting demands of the public will not allow them to handle baggage, as Tom Hood advised the management of the body of the despairing suicide:—

"Take her up tenderly
Handle with care."

It is a public demand that every thing shall be done in the shortest possible time, but it is a wasteful and often suicidal demand. We do not "live out half our days." If we exist the allotted space of man's life we do not live. We are driven by this spirit of hurry as relentlessly as the poor souls in Dante's Inferno by the tormenting devils of Hades.

But laying aside all considerations affecting the general welfare of the race, the element of hurry—not judicious employment of time—in the building of engineering works and machinery, is really injurious. Men and concerns are intrusted with the building and completion of a work of magnitude, which is to remain for the use of future generations and as a monument of our skill and workmanship—and, instead of priding themselves on a job well done, they boast, rather, of one quickly performed. We have bridges that break down, ships that founder, engines that fail, boilers that explode—not to speak of theories that will not stand the test of practical use—simply because we conceive time to be of more value than any thing else. It is all wrong. The engineer had better take twelve months to test and perfect his plans, and then plenty of time to build his structure, than to make it an experiment, the offspring of crude ideas. The mechanic would do better to study the parts of his machine, and at last embody them in a perfect and practical whole, than to be satisfied with a hurried completion of a work that may ruin his reputation.

If "large bodies move slowly," works of use and for endurance should be carefully and slowly constructed. A crude idea may be worthless, and it may contain the germ of a valuable improvement, but neither of these facts can often be ascertained without patient investigations and repeated experiments. Hurry is the curse of our mechanics. It prevents them often from successfully competing with the studious German, the patient Swiss, the persistent Frenchman, and the obstinate Englishman. We jump at conclusions, and insist that even if "Rome was not built in a day," we can erect a greater than Rome in an hour.

We need to use care, patience, *time*, if we ever intend to succeed as mechanicians. Time employed in the elucidation of an idea, the demonstration of a theory, the test of an improvement, or the reliability of an invention is never wasted. The fruit may be long ripening, but, when ready to pluck, it will not prove defective.

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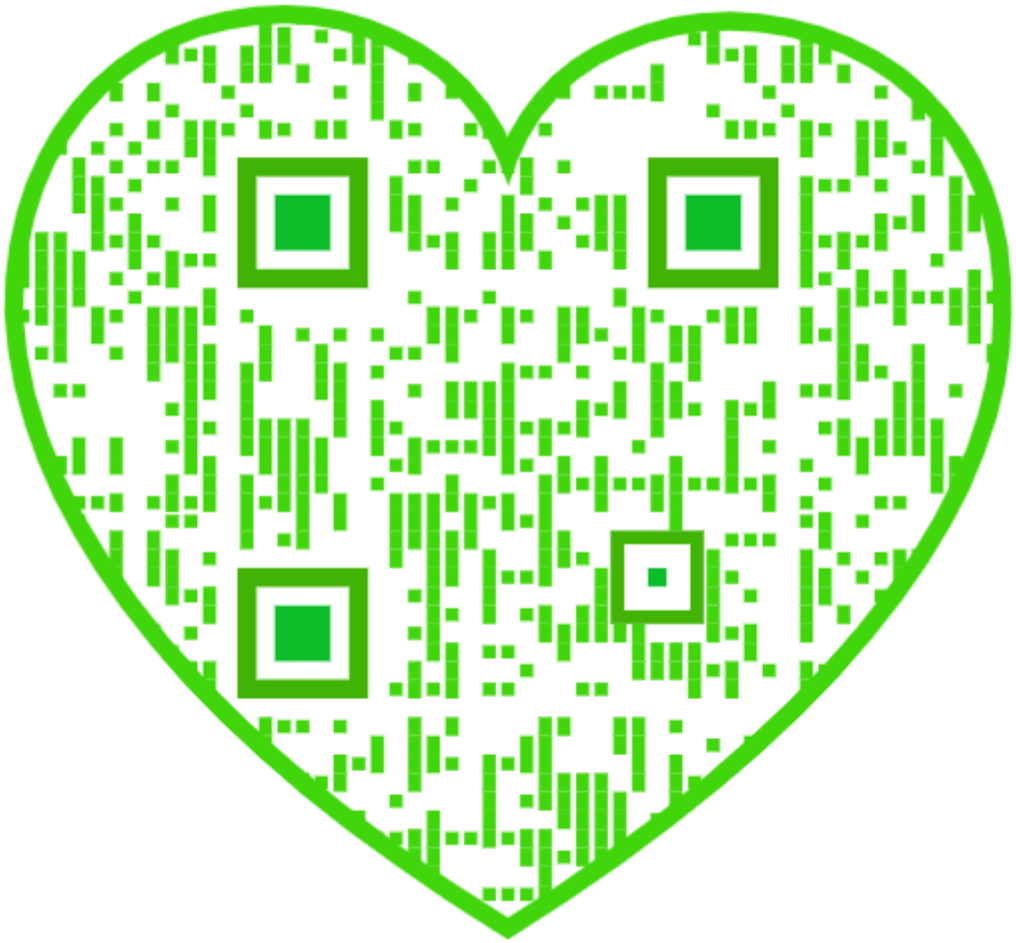

[Special Correspondence of the Scientific American.]

THE WORCESTER MECHANICS' FAIR.

WORCESTER, Oct. 1, 1866.

When I was a boy the "schoolmarm" used to impress upon my memory the necessity of fixing permanently the natural boundaries of the States. The lakes, rivers, and States that were thus forced upon my attention have remained ever since objects of affection.

If I were asked to define the position of Worcester I should say that it was bounded on the north by engine lathes, on the east by planers, on the south by boilers, bolt cutters, and steam engines, and on the west by all sorts of machinery for various purposes. Certainly a finer show of tools than those in the Mechanics' Fair just closed here would be hard to find. I knew very well that a good many machinists' tools were constructed in Worcester, but the variety, as well as general excellence, surpassed my expectations.

The men who make the tools have associated themselves together and built one of the finest edifices in the State. It is a large and massive brick building containing two splendid halls for public amusement, beside various smaller offices and rooms occupied by other associations. In the upper hall they have one of the largest organs in the country, equal to that in Boston in point of power and tone, and, beside this, the reading room is well supplied with periodicals, so that after the labors of the day are over in the shops relaxation and information are both to be had. From these few facts you can see that Worcester mechanics are not content to plod on in the dull and well-trodden path of commonplace, but strive to elevate themselves and their profession. The result is easily seen in the quality of the work done by them. Without further preaching, I shall tell you what I saw in a few days' sojourn.

The arrangement of the material was excellent, and without that "higgledy-piggledy" appearance which characterizes too many industrial expositions. The heavy machinery was in the basement. Carriages occupied the hall of the main entrance, while above there were looms, steam engines of a small class, leather-cutting machines, and materials generally used in the arts. In the extreme upper room of the building were the finer wares, such as sewing machines, textile fabrics, clothing, etc., etc. As a consequence you knew where you were, so to speak. If you wished to examine one class of goods you could do so without running up and down a dozen pairs of stairs. Every thing could be seen systematically and thoroughly; this, to persons who go to such exhibitions to be posted on the latest inventions and improvements, is a thing of no small importance.

IN THE BASEMENT.

The first thing that strikes the eye of the visitor on the lower floor is the large lathe for turning locomotive driving wheels. This machine is unusually fine in point of finish, while its proportions are massive. It weighs about ten tuns, and in point of convenience for shifting the carriage, general accessibility, for changing the speeds of the cone, is well constructed. The backhead and spindle are unusually strong, and taken all together it is a fine machine. It was built for a railroad company in New Jersey, and is to be sent away at the close of the Fair. Beside this, Mr. Pond turns out a number of other tools of all classes. His engine lathes are in great demand; and I was told he generally made about six every month.

THE NEW YORK STEAM-ENGINE WORKS.

Directly back of Mr. Pond is a fine boring mill designed by Mr. A. B. Couch, who knows a good tool when he sees it, and, what is more, knows how to make one. This boring mill is also at work, and has a very long bed raised by screws under each end. The frame that carries the bush which the end of the boring bar works in is unusually strong, and is not fastened to the table the work is on, but entirely independent of it, being capable of moving close to the job so as to make the bar as short and stiff as possible.

A small shaping machine was also shown by this Company which is universally admired by machinists This little machine stands on a column, the body of which holds the tools. It is not only neat looking but as solid as a rock, and has the feed so connected that the tool is advanced when about to return. It occupies but very little room and can take a good stout cut. There are also lathes and planers on exhibition by the Works which evince not only taste, but a knowledge of mechanical principles in regard to the proper distribution of the materials.

BELLOWS & WHITCOMB'S TOOLS.

In one corner Messrs. Bellows & Whitcomb have a twenty-five horse engine at work furnishing power for the machinery. There is nothing peculiar in this engine as regards the design, but it is well made and strong. The same firm also show engine lathes and portable engines which are useful and convenient machines.

KNOWLES'S STEAM PUMP.

Mr. L. A. Knowles, whose factory is at Warren, Mass., makes a fine show with his pumps. These are in all respects first-class machines, and the way they force the water is a caution. These pumps have all ground joints on the face, with steel rods and the best materials generally, and are certified by competent judges to be unsurpassed for efficiency and economy.

HENDERSON'S STEAM PUMP.

Horace McMartree & Co., of Boston, exhibit a little pump which is plainly got up, but works to a charm. The valves are rubber balls for ordinary work, and are contained in the plunger itself. It takes but little room, and runs at a high velocity without shock or jar. A very small pump, not over two and a-half inches in the barrel, threw water from an inch nozzle about 100 feet high.

A variety of other tools were exhibited here, but I have not space to enumerate all. Wood-working machines were in operation which were highly esteemed by the visitors. J. A. Fay & Co., of Cincinnati, were on hand with their scroll saw and did some fine work with it. A carving machine or tool for working out moldings on irregular forms was also shown. This was a simple machine having nothing but two cutters on the end of a spindle; by a simple arrangement the cutters were reversed so that right and left hand work could be done to accommodate the grain of the wood. A slate-pencil machine was in operation which made a great many at once. The slate was run under a row of cutters on a mandrel revolving at high speed, and came out at the other side completely finished.

WASHBURNE HALL.

In Washburne Hall there were a great many things well worthy the attention of mechanics. Not the least were some beautiful edge tools made from black-diamond steel of Park Brothers, Pittsburgh, Pa. The firm had quantities of this celebrated brand on exhibition, one piece being six inches square and about four feet long. This steel bears a very high reputation and is warranted to be uniform in quality. Just complaint on this score has been made against American steel, and we hope the reproach cannot be uttered again.

WASHBURNE'S STEAM ENGINE.

The whole of the machinery in the hall is driven by Washburne's steam engine. This is another novelty in steam motors, and is without question a most ingenious and compact machine. When I say that it is no larger than a common ice cream freezer, that it has two cylinders, 3 7-10ths inches bore by 1 85-100ths inches stroke, that it runs about 370 revolutions per minute, and drove all the machinery in the hall without once flagging or halting, your readers can form some estimate of its power. The machinery is as follows: one loom, one carding machine, one twenty-shuttle tape loom, one cloth loom, one spinner, twenty spindles, envelope machine, six fine wire blocks, three hoop-skirt covering machines, one eight-foot planer, one 16-inch engine lathe, one 15-inch engine lathe, one card and two small printing presses. These machines were all new and consequently took much more power to run than old ones, but with all that the little steam engine marched off with it easily and seemed to want more.

The simplicity of this engine commends itself to all. It is capable of being run at a very high velocity having no complicated arrangement of valves and pistons. I cannot describe its peculiarity clearly, and shall not attempt it. It is probable that your readers will have an opportunity of seeing an illustration before long.

SHAW & JUSTICE'S HAMMER.

A loud rapping attracted our attention from this engine, and on investigating the cause we found a crowd assembled round a small forge hammer. This was a new invention lately got up in Philadelphia, and manufactured by Shaw & Justice. I can describe it well enough, for there is not much to do in that way. It is simply a square block of steel suspended from a steel bow by a leather belt, much the same as if an arrow was hung from a boy's bow. This steel block moving in guides is driven at a high speed and by compressing the spring at each stroke gives a very powerful blow. The hammer was shown by Mr. Egbert P. Watson, of your city, who explained and illustrated its action. It was highly approved by all the leading manufacturers, who thought its simplicity and efficiency were very marked. I was told that many of them were now in use and that they are shortly to be introduced in some of the largest manufacturing establishments in the State. I have been thus prolix concerning this machine for it seemed to me to be a great improvement over cumbrous trip hammers that are constantly out of repair.

HOARE'S VISE.

A novel vise is shown by Mr. Hoare, which is a most convenient tool. The jaws are offset one side the screw, so that long work can be held the whole width of the jaws; a handy thing for gunsmiths, etc. The vise can also be swung round, so as to take any angle, or it can be removed wholly and put on a planer, the bottom being faced off square with the jaws.

SHOE-PEGGING MACHINE.

If there is any one among your readers who likes to peg boots for fun, I can tell him that there was a machine exhibited at this fair which knocks hand pegging into a cocked hat. By means of a small device held in the hand and turned by a crank a man can peg a row round the sole of a boot while you are looking at him. I watched this exhibitor grinding out the pegs, and I can assert that he did a good job in short order.

MUSICAL INSTRUMENT.

Mr. Isaac Fiske, of Worcester, Mass., exhibits a beautiful case of cornets, which embody many improvements calculated to enhance the tone of the instrument. By a new and peculiar process Mr. Fiske attaches the "bell" to the other parts of the instrument so that the vibration is unchecked, and that dull, muffled sound, frequently met with in others, is entirely obviated. Mr. Fiske has also simplified the manufacture of the cornet in a great degree, and has got up many tools which not only expedite the processes but enhance the strength for a given weight of material. His musical instruments are widely known and esteemed.

RULE FOR FINDING THE SIZES OF GEARS.

Mr. Charles B. Long, of Worcester, Mass., exhibits a case of boxwood rules handsomely got up for the purpose of finding the size of any gear with any desired number of teeth to the inch. He thus brings the somewhat complicated process of finding size within the comprehension of persons of limited education. The rule is marked off in vertical columns with the diametral pitch from 10 to the inch to 16. These columns also contain any number of teeth from 10 to 321, so that by referring to them any one can find the exact size of the gear in inches, the dimensions being laid down the same as a common rule; a two foot rule contains over 2,000 gears. Mechanics will find this a capital instrument.

STOVES.

The Earl Stove Company exhibited some fine wares of their make, among which was a new and efficient heater for rooms. It was designed on well-known principles so long in use in steam boilers, namely, admitting air in fine streams directly over the fire, thus consuming the products of combustion which ordinarily escape. In the hall were some fine soap-stone stoves, highly polished, which made a fine show.

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I cannot begin to enumerate all the novelties shown, and may as well stop here as anywhere. The fair is one of the finest held here in a long time, and far surpasses those curious exhibitions given by that old fossilized institution in your city, the venerable American Institute. I believe the judges of this fair have no interest in the machines, and have no idea of awarding themselves premiums.

HAMMER AND PEN.

THE TARGET EXPERIMENTS AT FORTRESS MONROE.

The following account of the target firing with fifteen-inch smooth-bore and twelve-inch rifled Rodmans on the 21st ult., is from one whose position and official capacity enabled him to ascertain all the facts in relation to the trial. It will be seen that his report differs essentially in several important particulars from that published in the papers generally:—

FORTRESS MONROE, VA., Sept. 24.

On Friday, 21st inst., the firing at the great target of iron plates and massive granite backing, took place here. Frames covered with two sets of wires were arranged in front of each gun in line of fire and fifty feet apart. The wires communicated with two sets of galvanic batteries, one for each set of wires; these, in turn, being attached to two recording machines, known as the "Benton Ballistic" and "Schultz Chronoscope," and which measure the velocity of whatever projectile may be used. On firing, the shot breaks the first set of wires, and each machine records the fact. When the second set are broken the record is again made, and the interval of time taken to pass from frame to frame—fifty feet—and the rate per second, are easily obtained.

Again, when the charge is prepared, a strongly-constructed cylinder of iron, solid to all appearance, is tied to the bottom of the cartridge. It is known as the "Rodman Pressure Plug." It consists of a cylinder, nicely fitted with a piston, terminating with a cutting edge, like a tapering wedge, and rests on a thick copper disk. On the shock caused by the explosion of the charge, the copper is cut crosswise and the depth and length is proportional to the strength of powder. The precise and relative pressure of the gunpowder and velocity of projectile are of great importance in gunnery.

The target represented the section of a casemate, the like of which for strength is not to be found in the United States.

Two 4-inch iron plates were secured edge to edge and bolted to the granite, while the lower plate had six inches of sand backing between the plate and granite wall. The structure was about 26 feet high, 7 feet 9 inches thick behind the plates, with a weight on the top of 200,000 lbs. of old guns etc., to increase the inertia. The whole represented a wall 30 feet high. Many of the stone were from 1,000 to 2,000 lbs. in weight. The mass of masonry was well secured with cement, iron "dowels" and "toggles." The plates weighed each about eighteen thousand pounds.

At 11 o'clock A. M., the 15-inch gun was prepared for action. Every officer was at his post. A cartridge of 55 lbs. of mammoth powder was placed in the gun and rammed home; then followed a ponderous round shot, weighing 432 lbs. The gun was then sighted, when the warning cry was heard "flag up," "prime," "fire." In less than a second the target was struck, a flash of fire, a thin cloud of black smoke, and the air was filled with fragments of shot flying in all directions as if a shell had just burst at the target. Then came an exciting race. Fleet horses, vehicles, well loaded with living freight, and a hand car propelled by three stout negroes freighted with officers, etc., soon arrived at the point of interest. It was found that the shot had broken into many pieces; the plate and part of the shot were intensely hot; the fine dust of the fragments had probably taken fire. Its effect was an indentation in the upper plate of about 15 inches in diameter and three inches deep. At the rear of the target two granite blocks were broken and driven outward about 10 inches, and other seams were opened in their immediate vicinity. The pressure was found to be 17,000 lbs., and the initial velocity 1,155 feet per second.

A second shot was fired from the same gun, aimed at the lower plate, which was punched through, but the wall suffered less than in the first shot. It was found therefore, that the wall was saved at the expense of the plate.

The third shot was of a very different character. It was a 12-inch elongated projectile, 24 inches long, weight 620 lbs., solid, and known as the "Dyer Projectile," constructed on the expanding principle, and quite recently brought to a state of perfection by Mr. Thomas Taylor, of Washington Arsenal. The charge used, as before, was 55 lbs. The gun was that known as the "Union Gun," a 12-inch Rodman rifle. Eight of these shots were fired at the target, and four solid 15-inch shot. The scene that succeeded reminded one of the ruins of Fort Sumter. The 600-pounder 12-inch, moved with a velocity of about 1,100 feet per second; the flight was smooth and regular, and the shots were distinctly seen in flight. Their effect was tremendous. The granite was ground into dust, which filled the atmosphere; pieces of stone were seen flying toward the gun, a distance of 300 feet. Solid blocks of over 1,000 lbs. weight were sent reeling backward ten and fifteen feet—one piece of 200 lbs. weight being found thirty feet to the rear.

So ended the experiments.

ONE OF THE SMITH FAMILY.

The Atlantic Cable of 1865.

The grappling and raising of the cable of last year in 1,900 fathoms, or a little less than $2\frac{1}{6}$ miles of water (instead of three miles, as has been so widely understood), affords, perhaps, an even more striking proof of the resources of telegraph engineering than the successful laying of this year's cable. There was, of course, no difficulty in finding the precise spot in mid ocean where the end of the broken cable lay. But it was a question whether the grapnel would drag steadily along the bottom at such a depth, or whether it would catch and jump successively from one point to another. It was not certain even that, with such a weight of grapnel wire out, it could be told when the cable was hooked, and it was a matter of the greatest doubt whether, even if once hooked, the cable could be hauled to the surface, supposing furthermore, that it was hooked within two or three miles of the broken end, so as to oppose but little friction in "coming home" along the bottom, as a cable laid with but little slack must have done to be lifted at all through two miles of water.

It is well understood that the course of the cable was first marked by buoys, and that the ship engaged in grappling—and there were four ships engaged in the task—first went according to the wind, three or four miles to the north or south, and then drifted broadside on across the course of the cable, with her grapnel dragging. To pay out 2,300 fathoms of grapnel wire took from one hour and twenty minutes to three hours, and the strain on the dynamometer in 1,900 fathoms of water was $7\frac{1}{2}$ tuns, increasing to $8\frac{1}{2}$ or 9 tuns, according to the motion of the ship. The cable itself weighed 14 cwt per nautical mile in water and a breaking strength of $7\frac{3}{4}$ tuns. When the steady strain on the grapnel line at the depth named exceeded 8 or 9 tuns, it was concluded that the cable was hooked, and this was generally found to be the case. Hauling in occupied five or six hours, the resistance occasionally reaching $10\frac{1}{2}$ tuns. As the wire came in with the cable, the resistance due to the weight of the former lessened, and that of the cable itself increased. When at the surface, the strain on the dynamometer was from $7\frac{1}{2}$ to 8 tuns, and the calculated strain on the cable was nearly up to its breaking weight. It was grappled ten times in all, and, besides being raised to considerable hights from the bottom, and then breaking or slipping off the grapnel, it was twice raised to the surface. The bottom of the ocean where the cable was raised is proved to be of ooze containing microscopic shells, and no accident can happen to the cable there unless it is purposely dragged for and broken, as it unquestionably may now be, by an evil-minded skipper having grappling gear of sufficient strength, or unless a wreck fell across it. It is now being confidently predicted by certain writers that both cables will soon be destroyed by icebergs. It is, of course, possible that they may, but the more the probabilities are examined the less they appear. Even if thus destroyed, however, in the iceberg track, which is only two hundred miles wide, the cable, being in shallow water there can easily raised and repaired.—*Engineering.*

Jungles on Fire.

The jungles of India are set on fire by the larger bamboos, as they are swayed by the wind, emitting fire from their hard glossy stems through the violence of their friction, and thus spreading destruction through adjacent mountain forests. These are so extensive that the fire continues to burn for many days together, and is as suddenly extinguished by mighty deluges of rain so common in mountainous countries where water pours from clouds resembling small catracts.

MISCELLANEOUS SUMMARY.

SOLDERING SOLUTION.—Mr. F. Oakley sends us the following recipe for a soldering fluid, which, he says he has used for many years, always with success:—

"Two ounces muriatic acid, in which as much zinc is dissolved as it will hold, to which add half an ounce sal ammoniac. Clean the metal well and the solder will run and adhere to any part of the metal to which the solution is applied. It will also solder brass and steel together."

DR. N. DYES, chief medical officer at Verdowa, has been experimenting with feeding of pigs on anthracite coal. The animals seemed to thrive so well under the treatment, that he has adopted this as an internal remedy to be used in all that class of diseases usually treated with coal tar externally.

AN official report shows that the French crops will this year fall short fully one-fourth of an average crop. In consequence, the commission and produce houses are making immense purchases of all kinds of corn and grain, and are anxiously looking for large arrivals from this country.

GOLD IN ALABAMA.—The Columbus, Ga., *Enquirer*, furnishes a communication from an "old miner," who says he has examined a mountain in Tallapoosa county, Ala., the rock of which he has tested, and which he considers the richest auriferous ore in the world.

THE telegraph in Switzerland is the property of the State. The charge is uniformly one franc for twenty-five words, or a little over one cent per word, irrespective of distance. Even at this low price a large revenue accrues to the Government.

IF a continuous solid iron rail were laid from New York City to Albany, no amount of force applied at one end could move the other in less than one minute and a quarter, the time required for mechanical force to travel in iron that distance.

AN immense aquarium is being constructed for the French Exhibition, having a front of one hundred feet. Sharks, porpoises, and every variety of fish are to be therein collected for the amusement of the public.

THE metric system is in force in France, Belgium, Holland, Switzerland, Spain, Italy, Portugal, and the States of the German Confederation, and legalized in the United States, and Great Britian.

THE value of the eyelets annually used in this country, though costing but eighteen cents per thousand, amounts to the sum of four millions of dollars.

AN expert printer will set about 25,000 letters daily, his hand traveling more than nine miles, and in the working days of a year about 3,000.

COMPRESSED peat, by a late patent, is destined to prove a rival of hard india-rubber in the manufacture of picture frames and other small articles.

IRON of a superior quality is found in abundance throughout northern Arkansas, and coal and zinc in the western part of the State.

A SEA wall for the protection of a portion of the harbor of San Francisco, is to be constructed at a cost of $2,500,000.

TWO YOUNG Americans stand first and third, out of a class of one hundred and thirteen, in the competitive examination of civil engineers, in Paris.

MORE than a million of new-laid eggs are daily imported into England from France.

EVERY thirty-five cubic feet of salt water displaced by a floating vessel are equal to one tun burthen.

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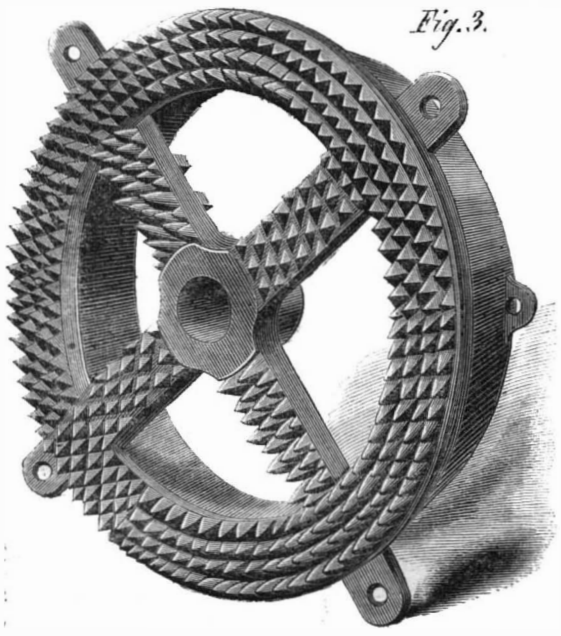
Improved Bark Mill.

Tanners understand the difficulty of getting a good leach from the bark as usually ground in ordinary mills. Some of it is a fine powder, making the liquor muddy, and a part of is in such large pieces that all the tannic acid cannot be extracted, involving a serious loss. Sometimes the bark is not cut, but rubbed and bruised. The object of the inventor of this mill, which is herewith illustrated in parts, was to procure a good quality of ground bark for his own business. It has proved excellently adapted to produce that result.

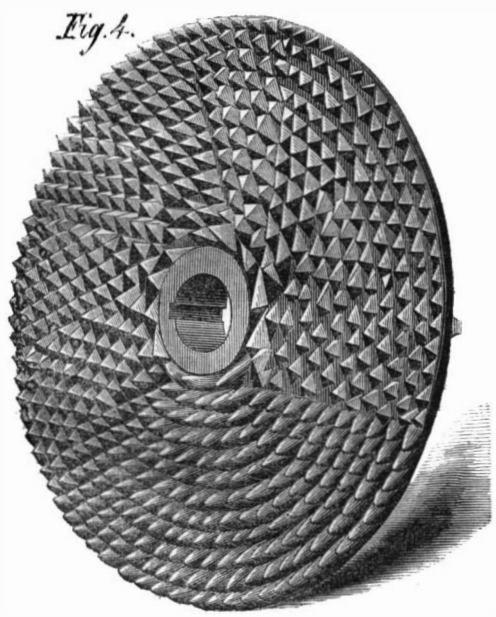
The frame work of the mill is built in the usual manner. Secured to its top by the lugs, A, is the hopper, its upper side shown in Fig. 1, and its under side in Fig. 3. The top of the arms has teeth, B, which act in conjunction with teeth on the radii

Fig. 3.



of the breaker, C, Fig. 2. The lower side of the hopper, as seen in Fig. 3, is armed, both spokes and rim, with teeth, which act with those on the disk, Fig. 4. This disk is secured to an upright shaft and revolves with it, as also does the breaker, C. The teeth of the breaker pass between the spaces of the teeth on the upper side of the hopper arms and prepare the bark, by cutting it in pieces, for the grinding surfaces of the hopper and the revolving disk. The fineness of the product can be regulated by screws, which raise or lower the vertical shaft with its appurtenances. The bark can be ground as fine

Fig. 4.



as ordinary corn meal, or left to any size required, the advantages of its operation being that the bark is ground uniform, and that nothing is wasted either by dust, or unground pieces incapable of being properly leached. This mill, it is claimed, requires no attention except that of being fed with bark. It is also adapted for grinding other material, especially bones and plaster for fertilizing, and corn in the ear for stock feed.

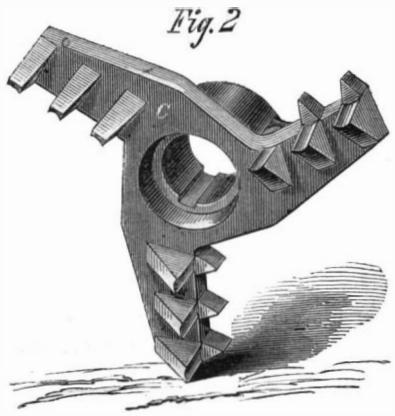
Patent issued through the Scientific American Patent Agency, Aug. 8, 1865, to N. Spencer Thomas, Painted Post, Steuben Co., N. Y., to whom all letleters should be addressed.

THOMAS'S BARK MILL.

Steamship Commerce on the Atlantic.

In the year 1858, Congress, through the recommendation of the Postmaster-General of Mr. Buchanan's administration, refused to renew any contracts for transporting the mails to Europe, and adopted the policy of sending the mails by every steamer, whether foreign or American. The London *Times*, at that epoch, advised British capitalists to "grasp this traffic and the lucrative trade that accompanies it, on the North Atlantic." Let us see how well this advice has been followed. The Inman line of steamers was, in 1858, just struggling into existence. It has now become a flourishing and profitable company, dispatching steamers twice a week each way between New York and Liverpool. The following lines have also come into existence within the last few years, and most of them have become

Fig. 2

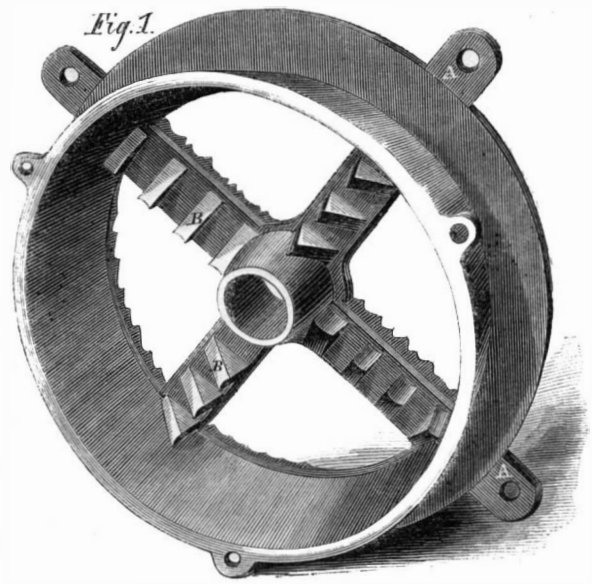


well established:—The North German Lloyds, between New York and Bremen, twice a month; North American Lloyds, between New York and Bremen, dates of departure irregular; the Hamburg American Packet Company, between New York and Hamburg, also weekly; the National Steam Navigation Company, between New York and Liverpool, weekly; the General Transatlantic Company, between New York and Havre, twice a month; New York Havre line, comprising the *Fulton* and *Arago*, monthly; the London and New York Company, between New York and London, twice a month; the Anchor line, between New York and Glasgow, twice a month; and the Continental Steamship Company, between New York and Antwerp. Including in this statement the Cunard service from Boston and New York to Liverpool, weekly, and the Montreal Company, from Montreal or Portland to Liverpool, weekly, we find that upward of four hundred and twenty round trips per annum (about three arrivals and departures for every two working days of the year, on either side of the ocean) are made in the Atlantic trade by steamships, mainly under foreign flags, and that the gross receipts of the foreign vessels engaged in this trade to our own shores amount on a fair estimate to upward of twenty millions of dollars annually. These lines, except three of the least important, are foreign, and are understood to be doing well.

In addition to the foregoing, the American and Holmstead Emigration Steamship Company, between ports in Sweden and Russia and New York, has just been organized, one steamer having arrived here a few days ago; and the Italian Government, it is understood, has just granted a subsidy of $160,000 per annum, for a term of thirty years, to a steamship company, to run bi-monthly between Italian ports on the Mediterranean and New York, touching both ways at Madeira, Cadiz, Marseilles and the Azores or Western Islands. In addition to this, it is stated that the authorities of the port of Genoa have also granted important aid, and that no doubt is entertained of the ultimate success of the enterprise.

With judicious assistance on the part of our Government, there is now some prospect that this important branch of commerce, which has been lost to us through bad management, will ere long be recovered, in part at least. During the last session of Congress, Senator Anthony introduced a bill to establish ocean mail lines between the United States and Europe: 1st, Between Boston and Liverpool, thirteen trips annually, at not exceeding two dollars per mile on 5,900 miles per voyage, or $153,400 per annum; 2d, New York to Havre, via Southampton, 6,540 miles per voyage, monthly service, at $170,040 per annum; and 3d, New York and Antwerp, 6,710 miles, at $459,440 yearly, on a semi-monthly service. As the New York and Boston Chambers of Commerce have both strongly expressed themselves in favor of special legislation for the encouragement of American steam navigation upon the Atlantic, it is confidently expected that the bill will pass both branches

Fig. 1.



of Congress at the ensuing session. If it does, the Postmaster-General will be empowered to call for tenders for a term of not less than seven, nor more than ten years, the average speed of the steamers not to be under ten miles per hour, and no offer to exceed the fixed maximum amounts specified, reckoned at two dollars per mile, which, in the aggregate, gives the estimated receipts for postage received by the Government on the transatlantic routes. As the late English administration gave notice some months ago that the system of paying subsidies for the conveyance of the mails to North America would cease in 1867, on the termination of the Cunard contract, there are additional grounds for hope that the monopoly of this traffic will not long be permitted to remain undisturbed in the hands of other nationalities. The facts and arguments in favor of the granting of judicious subsidies to steamship lines between Atlantic ports and Europe are so cogent that it would seem to be necessary only to place them clearly before Congress to secure the desired legislation.—*Shipping and Commercial List.*

The Suez Canal.

In a little more than a year, the great work projected, but never begun, by Napoleon the Great, will be completed. The Cape of Good Hope, at the southern extremity of Africa, will become to European commerce what the Isthmus railway has made Cape Horn to our Atlantic and Pacific trade. Africa will no longer block the highway between Europe and the East. While we are endeavoring to reach the Indies by a road across this continent, Louis Napoleon is connecting the Mediterranean with the Red Sea and the Arabian Gulf. It will undoubtedly be a success, and become one more link to bind the nations together in the bonds of commerce, the precursor and *avant courrier* of a higher civilization.

In time of peace Europe keeps in arms nearly four millions of men, at an annual cost of over six hundred millions of dollars.

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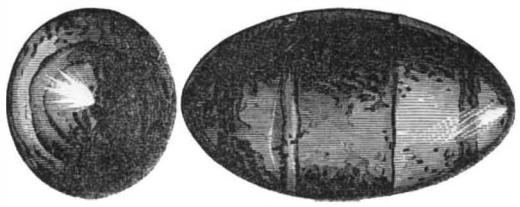
THE MAD STONE.

There is a superstition, or a popular belief, "as old as the hills," that certain stones, or mineral substances, possess the power of extracting the virus of poisonous bites from the human system. We frequently hear of wonderful cures performed on those bitten by venomous reptiles, or insects, by its means. In No. 11, Vol. XV., current series, we published a statement of such a case from an Indiana correspondent, in which it was said that the stone was procured from the "rennet of a deer."



Such a stone has been shown us, from which the accompanying engravings are made. The illustrations repesent the curiosity in full size, one a longitudinal and the other an end view, showing the shadings on its surface. It will be seen that the stone is almost a perfect ellipsoid, slightly flattened in the line of its shorter axis, as may be noticed in the transverse view. From its weight and appearance it seems to be composed of phosphate of lime.

This stone was brought to us by Mr. Er Lawshe, of Atlanta, Ga., who gives the following account. It was taken from the stomach of a deer shot in Houston county, Ga., by David Halliburton. Similar concretions are not unusual in the deer's stomach; those which are young having small ones, sometimes not larger than a pea while in older animals they are much larger. This is one of the largest Mr. Lawshé has seen. His experience of its reputed medicinal virtues is limited. His brother, in swarming a hive of bees, was stung on the back of the neck, and this stone, having been heated in warm water, was applied to the swelling one minute, when the pain and swelling together disappeared. Mr. Lawshe states, on the authority of hunters in his section of the country, that the deer feeds with impunity on the wild, or poisonous ivy, his escape from death being attributed to this stone. In one case a hunter killed a deer while browsing on the ivy, and although the flesh was eaten by himself and others without bad effects, his dogs, who eat the entrails, died.

All this seems to be somewhat doubtful, yet there are many cases related of the virtues of this stone. The specimen under consideration appears to be a water-worn pebble, and totally unlike the concretions found in the bladder of the human body which are indicative of disease. In the opinion of some of our chemists and geologists, to whom it has been submitted, it cannot be a product of animal disease, but is unmistakably a mineral production, accidentally or purposely swallowed by the animal. They do not subscribe to the popular belief in its virtues, and attribute its professed effects to imagination. As a curiosity, however, without regard to the fact or falsity of the assumptions made for it, we considered it of sufficient interest to engage the attention of our readers. Knowing nothing practically of the value of these curious natural productions, we presume to offer no opinion on the subject of their medical properties. It has been suggested that the material for these stones is found in the calcareous and silicious soil about the salt licks, which deer frequent, and that, being of an indigestible nature, it remained in the stomach, gathering gradual accretions, and by muscular action being slowly "rounded into form."

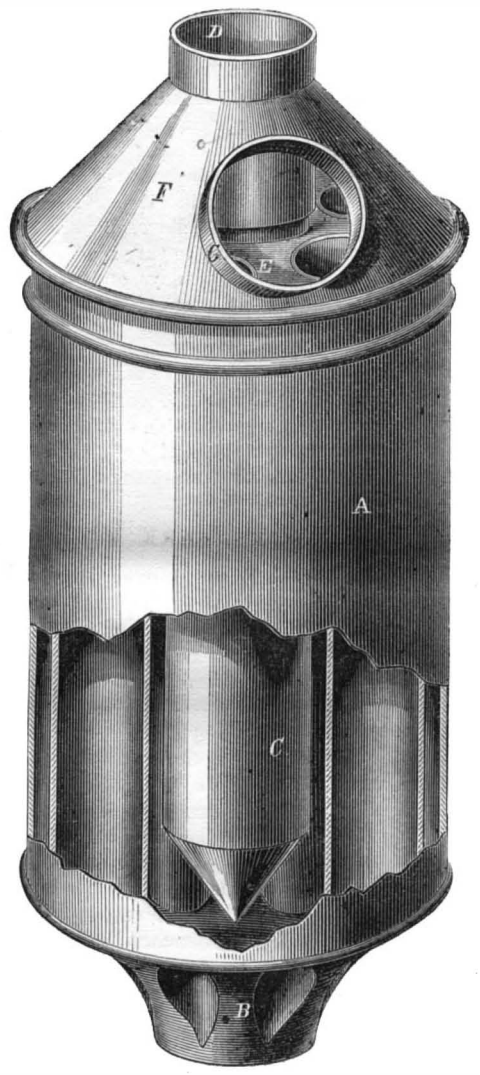
This opinion receives some force from the fact that similar stones called "bezoars" have been known and used in the East from time immemorial, and are usually found to be concretions surrounding some foreign substance in the stomach of ruminants. The pearl is said to be formed in a similar manner, and the Chinese introduce beads and small images into the pearl oyster, which in time become coated with the substance.

THE total earnings of railways in the United Kingdom amount to over $200,000,000 annually.

MORSE'S STOVEPIPE FURNACE.

The desideratum of utilizing all the heat from combustion has been sought by attempts to burn the smoke and gases of a fire, but has not yet been effectually attained. Appliances have been devised to arrest a portion of the heated air in its progress from the fire to the external atmosphere. The invention here illustrated is of this character, and the inventor declares it to be entirely successful.

It is a cylinder, A, of tin or other sheet metal, having a cast-iron bottom, B, which receives one end of the stove funnel. In the center of the drum, A, is a cylinder, C, closed at the bottom by a cone-shaped cover, and opening at the top, D, to receive the prolongation of the stove funnel. Surrounding this central tube are others, placed at equal distances, and open at the bottom at B, and at the top at E. These are merely conductors for the atmospheric air, while the smoke and gases of the fire rise through the funnel at B, and pass up between the central and surrounding tubes heating the air in the



latter. The cone-like bottom of the central cylinder diverts the smoke on all sides to the walls of the other cylinder, thus surrounding the air tubes.

When the heat is required in the room where the stove is situated the cone cover, F, is not used. It is intended to retain the heat and divert it through the aperture, G, whence it is led by a pipe to any room desired. It is claimed that by this waste heat from an ordinary cooking stove, rooms may be dried and warmed, or fruit or clothes dried in a closet or attic, which could not be heated by any other means.

Patented through the Scientific American Patent Agency, March 6, 1866, by E. P. Morse, Batavia, N. Y., who will furnish any further information.

AN official report shows that in British India, there are 4,971 miles of railways in course of construction, of which 3,213 miles were in working order last spring.

THE Chicago and Northwestern Railway has 1,020 miles of main track open, and within a year it will be completed to the Missouri river and connect with the Pacific Railroad.

Correspondence

Grain Elevators---Grain Trade.

MESSRS. EDITORS:—In the number of Sept. 15th, under the head of "How Grain is Stored in New York," you state the amount received in New York, and you also give a description of the fire-proof "United States Elevator and Stores" in Brooklyn.

The grain trade is a marvel in its volume, and over twenty years ago began to necessitate grain elevators in its movement. Mr. Barton, in a historical lecture a few years since, in Buffalo, stated that the "Dart Elevator" was the first one in that city, built in 1844, and I think the first one in the country for storing and transferring grain.

With the design of obtaining the correct history of this great institution in our country—grain elevators—I have at different times urged the Commissioners of the Agricultural Department to issue a circular to the Board of Trade of the various cities, from New York to Chicago, by which to obtain the capacity of each elevator in the respective cities, with full description and cost, but have been unsuccessful in my efforts. It would be quite an appendage to the Paris Exhibition if one of our mammoth elevators were there in full operation.

Europe is far behind us in this matter, though they have never had such vast quantities to handle in transportation. In the grain ports of the Danube the grain is carried in sacks on men's shoulders from the storehouse to the vessel. Dantzig, a Baltic port and a grain mart for centuries, had, at the period of Mr. Jacob's "Parliamentary Report of the State of the Corn Trade in the North of Europe, 1826," but indifferent facilities for handling grain; and the poor methods of transportation descending the river Vistula only forty years ago, which he describes, would be surprising to men on the line of the vast grain tide that flows from Chicago to New York.

During two years of our late war it is an astonishing fact that, exporting each year over 59,000,000 of bushels of cereals to Great Britain, we furnished the 29,000,000 of the population of the United Kingdom bread food for one meal in three of their daily bread for that period, beside liberal supplies to her dependencies in other parts of the world, and also to other foreign countries. Such a grain export from any one country is unparalleled in the history of commerce.

It may be further remarked that, from a scale of prices published in the Parliamentary returns, of grain imported from the different countries, by a calculation which I have made, the wheat from the United States was 16 per cent better in price and therefore better quality than that of the combined average imported from other countries. Yet was our export of wheat of an inferior quality to the average of that sold in our own markets, so that the people of England, in the mass, subsist on a poorer quality of bread than do the people of the United States, we should say 20 per cent poorer in quality, even modified by taking into the account their own English-grown wheat.

You speak of canal boats unloading at the Brooklyn elevator. A short time since, being on the *Dean Richmond*, I noticed the large number of "tows" we met and passed in the course of the two hours' daylight before reaching New York at 7 A. M. At this rate quite a fraction of the area of the river from New York to Troy must be occupied continually by the "tows" during navigation. I was reminded of the words of that powerful pleader, Elisha Williams, of Hudson, who, in a speech in the legislature advocating the passage of the Canal Bill, in 1817, earnestly appealing to the New York delegation, who opposed the canal (!), to win them over to the measure. Said he, "If the canal is to be a shower of gold it will fall upon New York; if it is to be a river of gold it will fall into your lap."

Kindred to these words of Mr. Williams was the prophecy of the late Jesse Hawley, the originator of the "Erie Canal," in his Canal Essays, published in the *Ontario Messenger*, at Canandaigua, in 1807, the year of Fulton's first trip to Albany by steam, and

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republished in Dr. Hosack's Life of Clinton, 1829. Enumerating the benefits that would flow from the construction of the canal, Mr. Hawley writes, "In a century the island of Manhattan will be covered with the buildings of its population." He did not then see what a brood of cities and towns would spring up surrounding Manhattan island. Nor did he see as an off-shoot of the Canal the Croton Water Works costing $15,000,000—twice and a-half the original cost of the Canal; nor the Central Park, another off-shoot, costing $16,000,000 more.

A. PENFIELD.

Washington, D. C., Sept. 25, 1866.

Insulation of Lightning Rods.

MESSRS. EDITORS:—A correspondent in your number for Sept. 8th says, "It is a common *error* to suppose that lightning rods should be insulated." Had he said common *belief*, he would have been nearer right; but whether error or belief, it is an argument against him, under the old maxim that what "everybody believes must be true." In fact, the belief, or error, if you choose, is almost universal. Almost all men who have made electricity a study believe and teach it, and the rest of the world believe it because so taught. All our electric telegraph men believe and practice it. But, says your correspondent, "the lightning rod ought rather to be so contrived as to facilitate free passage from the building to the rod and thence to the atmosphere, and *vice-versa*." If so, let us have our lightning rods laid with our courses of brick or clapboards, and sticking through our roofs with one end in the building and the other out; for, in that position, they could certainly much better facilitate the free passage from the building to the atmosphere, and *vice-versa*.

It is true that "currents of electricity are continually circulating through masses of matter in a rarefied state," and by so doing perform a very useful office, and we need no lightning rods to rid us of the friend, but when it comes in bolts, on the outside of our dwellings, then we prefer to interpose some "obstruction" to its passage into the dwelling.

I cannot conceive of any appositeness in comparing a lightning rod to a safety valve. We certainly do not generate electricity in our dwellings in dangerous quantities, as a boiler does steam, and if we did I should want the safety valve on conductors leading it out as above suggested, and not stapled on the outside merely. It would seem that a lightning rod should be rather a shield than a valve, and to not insulate it is to leave it so that the bolts may penetrate it and do damage beyond it. It is true, as he tells us, that the rod should be brought in "metallic contact" with all important metallic substances on the outside of the building. But why? Simply because the rod will be relieved thereby of so much electricity as will be required to charge such metal, just as lateral points relieve the rod by discharging any overload from it; but if his theory is correct, why not connect the rod with any metals within the house as well as outside?

Prof. Horace Mann, late of Antioch College, than whom there is no higher authority on this subject, says, "The old method of fastening the rod to the house by an iron staple, is a direct invitation, or rather a direct command, to the lightning to come in; and when it does come in, we all know what liberties it takes. Electricity, indeed, is valuable, is indispensable in all our dwellings, but not in the form of bolts."

But, Mr. Editor, while I thus argue for insulation, I would not mislead, and, therefore, say I do not mean glass rings. I do not consider any rod as insulated which runs through glass, for, when the electricity destroys the glass, as it is sure to do if in the form of bolts, then the rod immediately falls in contact with the staple which held the glass, and becomes, in fact, a stapled rod, and the records are full of disasters caused by such rods: indeed, people seeing their failures, and believing them to be, as they are generally called, lightning rods, have come to be skeptical of the value of all rods. But, I believe that a lightning rod properly put upon a building, with insulation, so that the rod does not come in contact with the glass—or the building—except it be with a metal roof or leaders, is as perfect a protector against electricity, as the roof is against rain.

W.

The Piston Question.

MESSRS. EDITORS:—In your notice of my answer to the question in your issue of Aug. 18, about the position of the piston of a horizontal engine, there is a mistake which I desire to correct. The question was this: "Where is the piston of a horizontal engine when the connecting rod is at right angles with the crank?" You mistake in understanding me to assert the crank to be vertical. In that case, my rule will not apply; but it does apply to the question as stated by me above. But when the crank is vertical, the connecting rod becomes the hypothenuse of the triangle, and I think that, in this case, the rule should read thus: Subtract the base of the triangle so formed (the crank being the perpendicular), from the sum of the lengths of the crank and connecting rod, and the remainder is the distance the piston has receded from the end of the cylinder, opposite the crank shaft; and the length of crank, or half the length of stroke, deducted from the above distance, shows how far the piston has passed the center of the cylinder.

With your permission, I should like to propose a question. I suppose it has been observed that, in the long days in summer, the sun, when it rises, shines into a north window, and also, before it sets in the west, will shine into the same window, thus demonstrating the fact that it both rises and sets north of a due east and west line, in our latitude: say of Utica, N. Y., which is, I believe, about 43 deg. north. Now, as the sun is said to vary but 23½ deg. from the equator, in the longest days, and Utica being 43 deg. north, how can the two be reconciled?

Sauquoit, N. Y. A. S.

Measuring and Regulating Temperatures.

MESSRS. EDITORS:—On page 200, current volume SCIENTIFIC AMERICAN, my attention was called to the subject of thermostats by a notice of one of your subscribers. I wish only to remark that the thermostat made on the principle mentioned by Mr. Grout works well; that of Ure, described on page 115, same volume, is unsatisfactory, for the simple reason that as it takes very little power to bend a flexible compound metallic bar, all thermostats founded on the principle of moving any contrivance by increased or diminished flexion of such a bar, operate with so little power that they usually refuse to do what is desired.

The modification suggested by Mr. Grout makes the thermostat to act, not on the principle of flexion, but of longitude and extension of the bars. I described the very same arrangement, with a wood cut, in 1843, in the *Konst* and *Letterbode* published in Haarlem, Holland, and applied it also as a compensation pendulum. I found, however, later, that this principle applied in the way as it is in the common compensation pendulum, namely, a steel bar between two brass bars, or a steel rod placed in a zinc tube, was preferable. This arrangement also acting by the difference of longitudinal expansion, may be easily made of sufficient length to cause a motion of a considerable fraction of an inch, which motion will take place with great force. I would advise Mr. Brown (see page 115,) to take a long beam of dry wood, which possesses scarcely any longitudinal expansion, and in a groove on its upper surface place a bar of zinc of the same length; fix this bar of zinc with one end to the end of the wood, and have the whole bar sliding freely; the other end will then project beyond the wood by any rise of temperature, and the wood may serve as the fulcrum for any mechanical arrangement. As the linear expansion of zinc for the desired 2 deg. is 0·00003 of an inch, we will find that a zinc bar must be about 300 feet long, to give a direct expansion of ⅛ inch every two degs. This length, however, being impracticable, it will be best to take a beam and zinc bar of 30 feet long, and attach a lever of inflexible material, of which the arms have the proportion of 1-10, or to take a bar 10 feet long and lever of proportion 1-30. Such an arrangement, when well made, will move a weight with almost irresistible force for the extent of ⅛ inch for every 2 degs. of change of temperature.

P. H. VANDER WEYDE, M. D.

Philadelphia, 1866.

On Lightning Conductors.

MESSRS. EDITORS:—I have noticed several articles in your paper lately on the subject of lightning rods. I have made the subject a study for many years, and have come to the conclusion, which is supported by practical experience, that it makes no difference what metal the rod is made of—copper wire, or iron—or whether it is insulated or not, so that it is put up right. The secret is this: from the point going down, it should go down all the way, and not ascend in any place.

You quote from Lyon in his ninth requisite, "the rod should run along the whole length of the ridge," which, if the ridge is level, will have many places between the insulators where the lightning will have to run up hill. No serious effect would come from this, providing the rod was large enough to carry the charge, but if not, it will jump off and seek some other road to the ground. Numerous instances of this kind have come under my observation. The most frequent are those on the telegraph line. In all offices between the main offices of the line, the wire is brought in at the top of the ceiling, and, running along near the instrument, descends several feet where the cut-off is—which is used to detach the instrument during a thunder storm—and then returns. Usually the wire in the office is copper and smaller than the iron wire outside.

Now the effect of a heavy stroke on the line is usually this: If it strikes a pole first, the top above and below the insulator is broken, part of the charge goes down the pole, the rest goes on the wire, and if it does not melt the wire between the poles and jump off, it will break the next pole below the insulator, showing that the wire could not carry all the charge when there was anything to jump to. Sometimes half a dozen poles will show the effect of this single stroke, and still the wire will have all it can carry. The first office this goes into it will jump from the copper wire to the ground wire, sometimes a couple of feet. Operators have learned this secret and usually have the ground wire close to the cut-off.

Your correspondent from Ohio, in No. 11, is right in speaking about insulation, as I believe it does no good but rather injury; but I differ with him in connecting the rod to the gutters, spouts, etc. Lightning don't seem to care how far it goes in getting to the earth providing it has a good road to travel. Last summer our school house was struck. The rod was in contact with the gutter, part of it went on the conductor to the cistern and burst it.

To secure a house against descending and ascending strokes, I would run strips of copper up each corner of the building, under the siding, over the roof boards and under the shingles, and terminate them with a point at the ends of the ridge. These, in good connection with the ground, will secure the house against all ascending strokes; still, I would have a good rod, the best and cheapest of which is a small iron cable, half or three-quarters of an inch in diameter, with a steel point, all painted black and spiked to the building with staples, and descending all the way from the point to the ground.

It would be a good plan to have the tin conductor connected with the ground with a copper strip to save the cistern.

W. E. P.

Lacon, Ill., Sept. 10, 1866.

Shot Guns.

MESSRS. EDITORS:—Many articles on rifles and rifle-shooting have appeared in your paper. Now, as the shot gun is the sporting gun of our country, will not some of your sporting readers give their views of shot guns? What makes a gun shoot close or causes it to scatter? Is it possible to construct a gun that will throw a charge of shot 35 yards within a circle of 16 inches? What would be the features of such a gun? I know that many of your readers are interested, and hope some one will give the information.

JOHN RICHARDS.

Columbus, Ohio.

A PRUSSIAN inventor will have at the Paris Exhibition a guillotine constructed on a new model, and capable of cutting off six or eight heads simultaneously.

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NEW INVENTIONS.

The following are some of the most prominent of the patents issued this week, with the names of the patentees :—

APPLYING TIRES TO LOCOMOTIVE WHEELS.—EDWARD MELLON, Scranton, Pa.—This invention has for its object the securing of tires on the wheels of locomotives without the aid of bolts and so that the tire, in case of becoming loose, cannot casually slip off from the wheel.

CARVING TABLE.—ROYAL E. DEANE, New York City.—This invention relates to an improvement in carving tables such as are used in restaurants, hotels, etc., for holding meats while being carved and keeping them in a warm state.

WASHING MACHINE.—J. L. WEAVER, Davis, Ill.—This invention is designed to furnish an improved washing machine by the use of which the time, labor, and expense expended in washing clothes may all be diminished.

LANTERN.—A. M. DUBURN, Chicago, Ill.—This invention consists in a novel manner of constructing the lantern, whereby all its parts are rendered accessible for repairs and cleansing purposes, the wick rendered capable of being adjusted higher or lower without detaching the lamp from the lantern, and the lamp supplied with a burner which does not require a draft chimney.

IRON RAILROAD CARS.—S. MERRICK, New Brighton, Pa.—This invention relates to the manner of connecting together and securing the panels to the car, whereby the constructing of iron cars is greatly facilitated and the panels rendered capable of being readily removed for repairs when necessary, and peculiar advantages afforded for the finishing of the interior of the car.

ROOFING CEMENT.—GEORGE STEAD, Brooklyn, N. Y.—This invention has for its object to furnish a roofing cement, or paint for pointing and painting metallic roofs, and other out-door surfaces, that will not crack or peel off; that will yield to the expansion and contraction of the surfaces to which it may be applied; and which will be more durable, tougher, and more elastic than ordinary paints or cements.

LOCK FOR TRUNKS, ETC.—JOHN GEO. KAST, New York City.—This invention relates to a lock for trunks, boxes, valises, and other similar articles, and it consists in a sliding bolt provided with two or more hooks which, by the action of a spring, are caused to catch in corresponding sockets or staples secured to the lid or cover of the trnnk, etc. The end of the sliding bolt is provided with a screw fastening so that a key can be readily connected therewith, and by pulling on the key the hooks of the bolt can be disengaged from their sockets. A spring stop which rises automatically when the lid or cover is opened retains the bolt in such a position that the cover or lid can be closed with ease and convenience.

SEED-PLANTING ATTACHMENT FOR HOES.—NELSON SAFFORD, Pleasant Valley, Vt.—This invention relates to a seed-planting attachment for hoes, whereby seed may be dropped and covered with the hoe at one operation.

DITCHING MACHINE.—EDWARD HEATH, Fowlerville, N. Y.—This invention consists in so constructing a machine that the ground may be ditched rapidly and to any desired depth for laying tile for the purpose of draining land; and more particularly for the peculiar and novel manner by which is produced a longitudinal motion to the excavator or digger and a lateral motion to the scraper through the same cross head. It also consists in the novel manner by which the machine is propelled forward by means of the same cross head.

CULTIVATOR.—JACOB K. REINER, Line Lexington, Pa.—This invention consists in the novel means employed for adjusting the beams in adjustable cultivators whereby said adjustment may be made with facility and the beams firmly retained in position as adjusted.

PRESSING HATS.—ISAAC T. GREEN, Milford, Conn.—This invention consists in the application of steam to the hat while the same is in place between the presser and the die in such a manner that by the action of the steam the material from which the hat is made is kept soft and pliable and said hat assumes the correct shape.

FURNACE AND BOILER.—HENRY MCCLURE AND JAMES ELLIS, Terre Haute, Ind.—This invention is designed to furnish an improved furnace and boilers so constructed and arranged that the heat shall strike the boilers, except the first one, above any deposit of sediment that may be in them; that the draft may be adjusted to all changes of weather; and that it may be a complete smoke consumer.

ROTARY SPADING MACHINE.—E. J. FRAZER, Erie, Pa.—The distinguishing principles of construction and operation of this machine consist in the arrangement for shifting the traction from the driving wheels to the rotary spade or digger, by which all the weight of the machine and driver, and any accessory loading which may be required, rests upon it and pushes the spades deep into the ground, the only operative force being that derived from the team; and, vice versa, shifting the traction from the rotary spades to the wheels, by which the machine travels with the spades elevated clear of the surface of the ground.

MACHINE FOR PRESSING BONNETS.—GEORGE M. RICHARDSON, Barre, Mass.—The object of this invention is to facilitate the operation of pressing bonnets and hoods, and consists in two hollow iron dies or molds, which are heated by steam, and by means of a screw are clamped around a block form, on which the bonnet to be pressed is placed.

PRIVY.—D. T. FORNEY, Wytheville, Va.—The object of this invention is to remedy the many defects of the system now pursued and adopted for the construction of privies, water closets, and other similar places.

FASTENING FOR NECKTIE, ETC.—HARRY M. HEINEMAN, Williamsburgh, N. Y.—This invention consists of a fastening or clasp of such a nature as to be susceptible of being readily fastened on or detached from the collar, to which clasp the necktie, etc., is attached by sewing or otherwise.

HOLLOW AUGER.—JAMES LEFEBER, Cambridge City, Ind.—In the hollow auger embraced in this invention simplicity, strength, durability, and cheapness are secured.

FASTENING FOR WINDOW BLINDS, ETC.—HEZEKIAH MONROE, Fall River, Mass.—This invention consists of two plates or pieces so constructed or arranged together as to be self-operating, when brought into connection with the fixed staples with which they are to interlock.

SPICE BOX.—WALLACE A. MILES, Meriden, Conn.—The object of this improvement in spice boxes is to prevent the loss of the aroma of their contents. This is accomplished by making them tight and close when not in actual use, their tops being so arranged as to be easily and readily opened to allow the spice to be shaken out after the manner of sprinkling or dredging powdered substances out of a box.

SETTING STONES IN JEWELRY.—FRANCIS STEFANI, New York City.—This invention relates to the setting of stones in jewelry, whereby the stone is held in a reliable manner, but can be easily removed at any time for changing the stone if desired.

CORD AND LINE REEL.—H. W. CHAMBERLIN, Jersey City, N. J.—The reel embraced in this invention consists of a flat piece of wood, molded with deep and capacious notches in its ends, for receiving the coil as it is wound upon it, and having handles so attached that the reel can be operated with great facility and rapidity.

GLOBE VALVE.—C. STIERLE and JOHN C. BAER, Cincinnati, Ohio.—This invention consists in certain improvements in globe valves, whereby the grinding of the valve seat can be evenly and accurately accomplished.

CULTIVATOR.—EDWIN CHILDREN, Lancaster, Wis.—This invention consists in a novel arrangement of the plow beams and the draft pole, whereby the plows may be moved or adjusted laterally with the greatest facility. The invention also consists in a novel manner of attaching the plow standards to the beams, whereby the plows may be adjusted more or less obliquely to throw the earth either toward or from the plants, as may be desired, or adjusted in a plane at right angles with the machine to cast the earth at both sides of the furrow when required.

STAMP MOISTENER—H. A. HOYT, Mott Haven, N. Y.—This invention has for its object to furnish an improved apparatus for moistening stamps preparatory to attaching them to their places

COALING ENGINE.—EDWIN R. KERR, Kewanee, Ill.—This invention relates to a new and improved means for supplying locomotive engines with coal, and it consists in having one or more chutes in a shed or building, which are provided with doors arranged in such a manner that the outer doors, when lowered or opened, will form a continuation of the chutes, and the inner doors so arranged as to admit of being readily opened to allow the coal to be discharged, the outer doors being counterpoised so as to work, open and close, easily without any slamming, and consequently without the liability of being broken or torn from their hinges.

PRESSING AND FINISHING HATS.—WM. WALSH, WM. WALSH, JR., and M. J. WALSH, Brooklyn, N. Y.—This invention consists in improved devices and machinery for finishing and pressing hats, whereby the operation is much facilitated.

FOLDING TABLE.—G. W. NELLIS, Richmondville, N. Y.—The object of this invention is to construct a table in such a manner that it may, when not desired for use, be folded into a small compass, so as to be capable of being stowed away in any convenient place without monopolizing much room.

BOOKBINDER'S PAPER CUTTER.—MICHAEL RIEHL, Philadelphia, Pa.—The nature of this invention is to provide a cutter for bookbinders, by which the paper may be pressed and cut simultaneously, and is so constructed that the instant the knife ceases to cut or has passed through, the press is slacked and the book is released at once from the press.

PAINT COMPOSITION.—G. W. MOORE, New York City.—This invention relates to certain improvements in that class of paints in which antimony or a compound of antimony forms one of the chief ingredients.

ROOFING.—JOHN ROUSE, Port Gibson, N. Y.—This invention relates to a tile produced of lime and sand mortar, in suitable molds, which are lined with cloth or paper to prevent the mortar from adhering to the mold, so that the tiles when dried can be readily removed from the mold. Said tiles are made with beveled edges, whereby their removal from the molds is facilitated, and a joint is obtained which can readily be filled with mortar. The tiles thus prepared are saturated with coal tar, asphaltum, or any other substance which fills the pores of the mortar and prevents it from absorbing any water when placed in a horizontal position, and consequently renders the tiles proof against frost.

SAFETY LAMP.—CARL RIEDEL, Guttenberg, N. J.—This invention consists of a lamp, the oil reservoir of which is hermetically sealed and filled with some absorbent material, such as raw cotton, sponge, or other substance, with a layer of pounded coal or other bad conductor of heat between the top of the oil reservoir and the absorbent material, in combination with a cylinder of wire gauze which surrounds the wick in the interior of the lamp, and with two hollow curved handles, in such a manner that with the proper treatment light hydrocarbon liquids such as naphtha, or benzine from petroleum, can be burned with perfect safety.

STEAM BOILER.—AUG. H. TAIT and JOS. W. AVIS, New York City.—This invention consists in the arrangement of angle and T-rings, welded and turned in the lathe to the proper angle for caulking, in combination with a series of cylinders made of boiler plate and riveted to the angle and T-rings, so that by said rings the boiler is strengthened and adapted for high pressures; also, in the arrangement of longitudinal bolts or stays, in combination with the angle and T-rings in such a manner that the principal strain exerted by the steam on the boiler is thrown on the rings and stays, and a cheap, durable, economical and strong boiler is obtained.

LOOM.—BENJAMIN OLDFIELD, Newark, N. J.—This invention relates to improvements in the batten, the shuttles and the sleys or reeds, and it consists, first, in the arrangement of two or more shuttles placed in an upright position, one behind the other and in the same place, in such a manner that more than the ordinary number of shuttles can be passed through one opening in the ways, and different colors can be introduced in the work without imparting to the batter or any part thereof, a rising and falling motion. Second, in cutting away the body part of the shuttle and substituting therefor a metal bow, in such a manner that the hight of the shuttle and the cost of its manufacture is reduced, and the quill in the shuttle can be readily reached and supplied with thread.

SURGICAL SPLINT.—RICHARD J. P. GOODWIN, Manchester, N. H.—This splint, which is applicable for fractures of arms or legs, and also for curing deformities. The invention consists in the arrangement of an adjustable band, applicable above and below the joint, in combination with suitable guides and fastenings, in such a manner that the limb can be stretched during the operation of applying the splint, and after the splint has been secured, the movable band can be readily adjusted over the fracture.

DRESS ELEVATOR.—CHRISTIAN GRUN, New York City.—This invention relates to an improvement in that class of dress elevators which are composed of a V-shaped bed plate with two spring jaws, which are so arranged that a portion of the dress can be clamped between each jaw and the bed plate, and this improvement consists in the manner of securing the spring jaws and the spring to the V-shaped bed plate.

GRUBBING MACHINE.—CORTLAND BALL and J. W. HOUGHTELIN, Detroit, Mich.—Patented August 15, 1866.—This invention relates to a new and improved device for eradicating or drawing out stumps, roots, etc., etc., and it consists in having two ratchets and a drum placed on an axle provided with two wheels and having upon it a frame to which pawls are pivoted to engage with the ratchets, the above parts being used in connection with a chain or clamp, whereby a very convenient device is obtained for eradicating or drawing out medium-sized roots, stumps, etc., and one which may be drawn from place to place and manipulated with the greatest facility.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

1996.—CONSTRUCTION OF ORDNANCE.—John Ericsson, New York City. August 2, 1866.

1998.—CARDING ENGINE.—Edward A. Cutler, Providence, R. I., and Charles Bliven, Putnam, Conn. August 3, 1866.

2000.—CHURN.—Leander Langdon, Northampton, Mass. August 3 1866.

2024.—MACHINERY FOR STAMPING, CRUSHING, AND PULVERIZING ORES AND OTHER HARD SUBSTANCES, PARTS OF WHICH IMPROVEMENTS ARE APPLICABLE TO POWER HAMMERS.—William Wright, New York City. August 3, 1866.

2026.—MANUFACTURE OF CARBONATES AND BI-CARBONATES OF SODA AND POTASH, THE SOLUBLE AND INSOLUBLE SILICIATES OF SODA AND POTASH, AND MURIATIC ACID, FROM CHLORIDES OF SODIUM AND POTASH.—Haydn M. Baker, Joseph H. Poole, and William R. Stace, Rochester, N. Y. August 5, 1866

2028.—CONSTRUCTION OF PORTABLE LANTERNS.—George Barnes Windle, 56 Malden Lane, New York City, but now residing at 53 Gracechurch street, in the City of London. August 5, 1866.

2034.—PRESERVING WOOD.—Louis Robbins, New York City. August 6, 1866.

2,036.—CHUCKS FOR TURNING LATHES AND OTHER TOOLS.—Isaac Smith and William Harvey Haight, both of New York City. August 7, 1866.

2,052.—IMPROVED TELEGRAPHIC CABLE.—Alexander De Morat, Philadelphia, Pa. August 7, 1866.

2,056.—MACHINERY FOR MANUFACTURING ENVELOPES, PARTLY ALSO APPLICABLE TO OTHER PURPOSES.—Edwin Allen and John Turner, Norwich, Conn. August 9, 1866.

2,058.—EXPLOSIVE SHELL.—Lewis Williams, Peekskill, N. Y., at present residing at Halifax, county of York, England. August 10, 1866.

2,063.—STAMPS FOR PRODUCING IMPRESSIONS, WHICH ARE ALSO APPLICABLE TO CYLINDER PRINTING.—Jabez Elverson, Newark, N. J. August 11, 1866.

2,067.—APPARATUS FOR MANUFACTURING ILLUMINATING GAS AND PRODUCING BONE BLACK AND OTHER VALUABLE RESIDUUM.—John Ensley, New York City. August 11, 1866.

2,073.—BREECH-LOADING FIRE-ARM.—Alexander Bergen, Brooklyn, N. Y. August 13, 1866.

2,082.—MODE OF FASTENING BOILER TUBES.—James Bowden, Horace Theall, and William H. Cobanks, New York City. Aug. 14, 1866.

2,084.—WATERPROOFING TEXTILE FABRICS, AND PRESERVING LEATHER, CORK, WOOD, AND VULCANIZED INDIA-RUBBER, ALSO TERRA COTTA, STUCCO, BRICK, AND LIKE SUBSTANCES.—Charles Baxter, Boston, Mass., now residing at Nelson square, Blackfriars Road, in the county of Surrey, England. August 14, 1866.

2,092.—APPARATUS FOR CUTTING, GRINDING, AND FINISHING MARBLE AND OTHER SIMILAR MATERIALS.—James W. Maloy, Boston, Mass. August 16, 1866.

2,104.—RUDDER FOR SHIPS AND OTHER WATER CRAFT.—William L. Wetmore and Nicholas D. Le Pelley, both of Cleveland, Ohio. August 16, 1866.

2,117.—CONSTRUCTION OF BALE FASTENING.—Hazard Knowles, New York City, and Henry Anwyl Jones, Brooklyn, N. Y. Aug. 17, 1866.

2,118.—STUFFING FOR MATTRESSES, CHAIR SEATS, AND OTHER LIKE PURPOSES.—Almanzor Alden, Matteawan, N. Y. August 17, 1866.

2,119.—PUDDLING FURNACES.—Christopher de G. Baker, Jacob Harlan, and Joseph Bell, all of Wheeling, W. Va. August 17, 1866

2,144.—MACHINERY FOR MAKING NAILS.—Excelsoir Nail Company (Incorporated), Providence, R. I. August 21, 1866.

2,154.—CONSTRUCTION OF SELF-RAKING REAPER.—James Marsh, Lewisburg, Pa. August 22, 1866.

2,159.—BREECH-LOADING AND OTHER FIRE-ARM AND BAYONET FOR THE SAME.—Charles Howard, New York City. August 23, 1866.

2,171.—SUBMARINE RAKE FOR GATHERING OYSTERS OR OTHER ARTICLES.—Job Johnson, Brooklyn, N. Y. August 23, 1866.

2,250.—MACHINE FOR MAKING EYELETS.—Thomas Garrick, Providence, R. I. September 4, 1866.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as a fee for copying. We can also furnish a sketch of any patented machine to accompany the claim, at a reasonable additional cost. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of the reception of their funds.

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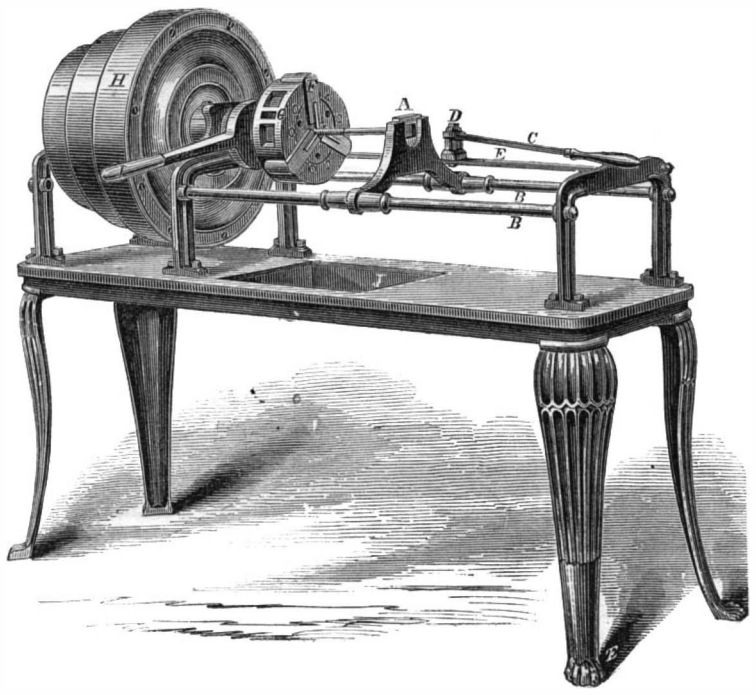
Improved Bolt Cutter.

No tool used in a machine shop is more necessary or oftener required than a bolt cutter. Some are complicated, and yet poorly perform the work, "raising" and weakening the thread, and not being easy of adjustment. The simpler the parts and the more absolute and direct their action, the more efficient and valuable any machine; and the bolt cutter, above all others, should possess these essential requisites. The inventor of the machine here represented, claims to have perfected a tool that is simpler, more readily adjusted, and capable of doing work quicker and better than most implements designed for the purpose. With it, he says, bolts can be cut close to the head and of any length desired, limited only by the size of the shop. But little explanation is necessary to understand its operation.

The cross head, A, sliding on the guide rods, B, is fitted to receive chucks for holding a bolt head, or can be furnished with a vise, the jaws moved by right and left hand screws. The lever, C, is attached to a sliding fulcrum, D, which moves on the rod, E, and can be used, if necessary, to start the cross head at the commencement of a cut. The dies are inserted in the jaws, F, of the revolving head, G, which is secured to a hollow spindle, sustaining the cone, H. By means of inclined slides passing through the head, and attached to the clutch and lever, I, the jaws can be opened from the center, or closed to the size of the screw required. When closed they are held securely in place. The dies can be adjusted to different sizes of bolts by a screw (not shown), which acts against the back end of the die. The recess, J, in the bed is for the reception of the oil and chips.

It is claimed that this bolt cutter is the cheapest in the market, that its work is equal to that of the lathe, and that the dies can be changed without moving a screw.

Patented by J. F. Rodgers, South Bend, Ind., whom address for rights and additional particulars.



RODGERS'S BOLT CUTTER.

Sliding Parallel Vise.

The object of this invention is to dispense with the laborious operation of turning the screw out and in to suit different articles of work, and changing the pin at the bottom of the vise jaw, which all mechanics will admit is a great loss of time as well as an annoyance, whereas in the illustration here shown, the movable jaw is adjusted instantaneously from one size to another, and the face of the jaw stands parallel with the bench, therefore it will gripe an article with greater firmness than is possible in the common vise.

The improvement consists of a ratchet, A, secured to the nut, B, and partially embracing the front of the nut. C is a catch, secured to the rear of the bench leg to engage the teeth of the ratchet. D is the movable jaw of the vise, E the screw, and and F a brace, to keep D in a vertical position and insure its parallel movement. Where the screw passes through the bench the aperture is elongated to allow of the raising of the ratchet out of the catch so that the jaw can be drawn out or pushed in at pleasure. A tenon on the upper side of the nut, B, works in a channel in the box, G, to guide the nut. Its operation can be readily seen. The improvement can be attached to any ordinary bench screw at a small cost.

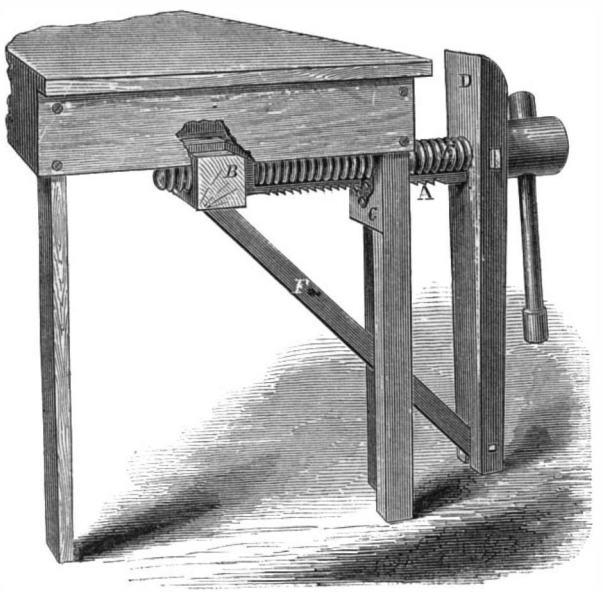
Patented Aug. 14, 1866, by O. V. Flora. All communications should be addressed to Flora, Moore, and Rogers, Box 55, Madison, Ind.

London contains 19,000 miles of gas pipes.

THE MANUFACTURE OF CARTRIDGES.

The cartridge for fire-arms for the use of soldiers is a subject which has employed the inventive faculty largely within a few years. The common fowling piece has been loaded for a great many years by means of open powder and shot, the powder being poured into the hand, measured either by a tubular gage on the flask, or estimated by the eye; the amount of shot being calculated in the same manner.

Then the paper cartridge was introduced for military purposes, the powder alone being placed in the paper cylinder, and, when used, the twisted end being bitten off by the soldier and its contents emptied into the gun. (Vide Scott's Tactics.) Afterward the paper cartridge, with ball secured at the top, was used, paper and all being introduced into the gun. Then skins, or the prepared intestines of animals, were employed as a receptacle for the powder, the projectile being placed at the open end and the skin secured about its base by a string. These were very neat cartridges. A brief description of their manufacture may not be uninteresting.



FLORA'S PARALLEL VISE.

The skins, or animal intestines, were brought from Europe in a dried and salted state. They were macerated in water until they became perfectly pliable and very elastic. The operatives were girls, each one of whom sat at a table, having at her side a tub of the intestines, looking like linen or cotton strings. Before her was a board bearing a number of upright pegs, in form like an elongated truncated cone, or, in other words, resembling a human finger. Over these, sections of the skin, cut off by a pair of scissors, were stretched, and when all the pegs were covered the board was placed in the sun to dry. When dry these pockets were filled with powder, the quantity graduated by weight, and the bullet was tied at the top. The skin is so thin and yet so tough, that, although the grains of powder are easily distinguishable through it, it will bear a large amount of rough handling. These were far superior to any paper cartridges.

But the metallic cartridges appear to be gradually displacing these other forms. They are made of sheet copper. The copper is cut by a punch into a circular disk, and at the same time, by means of a punch and die, is formed into a cup shape, the punch forcing the center of the copper disk down through a die. This operation is repeated, by means of constantly diminishing punches and dies, until the requisite diameter and length are obtained; annealing and washing being occasionally resorted to for softening the metal and removing the oxidized scales.

When brought to the proper size and shape, the shells are placed upon a revolving spindle and cut to the required length, the upper edges being, of course, irregular in outline when the shell comes from the last die. The shell must then receive a head, or rather the head or bottom, which is now of no larger diameter than the body, must be "upset" to make a receptacle for the fulminating compound, which is distributed around its circumference. To secure this result, the shell is slipped on a spindle, having a shoulder at the proper distance, and a "header" strikes a blow against the bottom which bulges out equally all around, forming a narrow rim at the base of the shell, of larger diameter than the body of the shell, itself, and hollow.

The fulminate, precisely like the explosive preparation used in percussion caps, is spread over copper plates, perforated with holes about three-sixteenths of an inch diameter. The material lodges in the perforations, which, by a suitable device, are brought over the shells so that the fulminate may be dropped into them. As this substance is to be confined to the rim of the head, it must be distributed. For this purpose each shell is held under a vertical spindle which is made to revolve very rapidly. The end of this spindle is cut into radial teeth, similar to the congeries of radii on the face of a millstone, by which the fulminate is forced centrifugally into the rim of the shell head. This is the only process in the manufacture of these cartridges attended with danger, as the compound is of a highly explosive character. The shell is then filled with powder, the base of the projectile inserted, and the copper crimped around its base.

These cartridges stand the test of rough handling, dampness, climate, and time, better than any others yet invented. They are fast superseding all other cartridges.

New Northern European Steamship Line.—The American-Scandinavian-Russian Emigrant Company has completed three new steamships which are to connect New York with Southampton, England; Christiania, Norway; Guthenberg, Sweden, and Copenhagen, Denmark. They will connect with other vessels running between Copenhagen and Stettin, Dantzic and Königsberg in Prussia, and Riga and St. Petersburg in Russia.

Tuning Pianos.—A correspondent suggests that an improvement might be made for tuning pianos up to a given standard pitch, by means of some device which shall indicate automatically when the required tension has been given to each string. Here is a chance for the ingenious.

Over five hundred cubic feet of air pass through the human lungs in two hours.

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THE
Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

☞ American and Mexican News Company, Mexico, are Agents for the SCIENTIFIC AMERICAN.

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VOL. XV., No. 16, [NEW SERIES.] *Twenty-first Year.*

NEW YORK, SATURDAY, OCT. 13, 1866.

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THE COMMISSIONER OF PATENTS.

The SCIENTIFIC AMERICAN has nothing to do with mere party questions, and what we are about to say, therefore, in reference to the Commissionership of Patents must not be construed into any indorsement or condemnation of any particular policy that now disturbs the great political parties of the country. It is unfortunate for the best interests of the people that, in the ebbing and flowing of political tides—as one party rises and another falls—the policy of proscription enters into every department of the Government. Jefferson's rule, "Is he honest? is he faithful?" has given way to the more dangerous rule, "Is he a good party man, has he political influence?" To contend against this principle, is to contend against the old declaration that "to the victor belong the spoils;" and herein consists the chief danger to the future safety of the Republic. The strife of party and the temptation that power places before officials, produce the evil spirit of political persecution, and tend to corrupt the virtue of those who deem themselves fortunate to get a position under Government, which is always held by a slender tenure.

The present unfortunate controversy which has sprung up between the President and Congress, has engendered an angry partisan warfare; and, in order to strengthen his position, the President judges it best to remove from office all those who do not heartily support his policy.

The people do not much care whether this man or that man holds a particular office. Their chief concern is to have the responsible offices held by honest and capable men. We have always contended that, in the application of strict party rules, the Patent Office ought to be exempt from a mere political partisanship—that appointments should be made with strict reference to individual qualification to perform the required duties, and that fitness alone should be the test.

It is a most dangerous and pernicious practice to remove an experienced officer from the Patent Office to make room for some political aspirant, whose only recommendation consists in fidelity to a certain line of party policy and discipline.

The Patent Office was not created to subserve the ends and interests of any party. Its administration requires integrity, and judicial and scientific knowledge, which experience alone can render eminently useful. It is no light matter to determine the intricate questions that are daily to be decided by the officials at the Patent Office, and inventors might reasonably be alarmed for their interests when changes are made for mere opinion's sake.

An impression has somehow gained currency that Commissioner Theaker is to be removed, and speculation is rife as to who is to be his successor. Representing the largest body of inventors in the country, we express the hope that President Johnson will not make any such change. Mr. Theaker is an honorable man, and has discharged his duties in a very acceptable manner. He is entirely conversant with the routine of the Office, is master of its rules and practice, and, withal, has a warm sympathy with the great body of inventors. No complaints have been made of his official conduct; on the contrary, we believe the great body of Patent Solicitors and applicants for patents, are entirely satisfied with Mr. Theaker, and would regret to hear of his removal.

IS STEAM A GAS?

If a solid body is kept at the same temperature it may remain at rest for any number of ages, but if it be subjected to heat, it begins to move. Its several particles retire to a greater distance from each other—widening the spaces between them. If the temperature be elevated sufficiently, the cohesion of the particles is destroyed, and they flow freely over each other; in other words, the solid is changed to a liquid. If the elevation of temperature be continued, the expansion goes on, till, finally, the liquid is converted into a transparent gas, like those that make up the atmosphere. If now the temperature be reduced the changes are reversed—the gas is transformed to a liquid, and the liquid to a solid.

Formerly a distinction was made between vapors which are condensable to liquids, and gases which were supposed to be incapable of condensation, and the distinction is still maintained by many writers, though there seems to be no philosophical foundation for it.

In the first place, each substance is evaporated at different temperatures, varying with the pressure of the atmosphere or other medium by which it may be surrounded. In the case of water this has been investigated with the utmost care, and we have repeatedly published tables of the results. Under the ordinary pressure of the atmosphere—about 15 pounds to the square inch—water boils at 100 deg. Cent., or 212 deg. Fah., and as the pressure increases the boiling point rises.

Then, among the several substances known on this earth there is the widest conceivable temperature of evaporation at the pressure of the atmosphere or other given pressure. This is forcibly illustrated in the following table of the boiling points of a few well known substances. We give the figures in the Fah. scale:—

Ammonia	boils	at	—28·6
Ether	"	"	+93·6
Acetic acid	"	"	240·8
Oil of vitriol	"	"	617
Mercury	"	"	662
Sulphur	"	"	824
Zinc	"	"	1904

The list might be extended in both directions till, in one, we reach substances which have never been evaporated by any degree of heat, and in the other, substances which have never been liquefied by any degree of cold. Indeed, it was owing to the supposed existence of substances that would retain the gaseous form under all conditions that the distinction was drawn between permanent gases and vapors. But it was found that by combined cold and pressure some of these gases could be liquefied, and as progressive improvements were made in the art of producing cold and increasing pressure, one after another of the supposed permanent gases was condensed, and now only six remain which have so far baffled the skill of our physicists; these are oxygen, nitrogen, hydrogen, nitric oxide, carbonic oxide, and marsh gas. Analogy leads to the very confident opinion that if reduction of temperature and increase of pressure could be carried far enough, these six also could be reduced to liquids.

In the other direction, substances which could not be boiled by the fire of any furnace in use, have vanished in vapor when subjected to the flame of the compound blow-pipe, or the still more intense heat of the galvanic battery. It is a common class experiment of Professor Doremus to lay a gold quarter eagle between the poles of his immense battery, and to hold a clean silver cup inverted over it, when the coin is volatilized, and the interior of the cup is beautifully gilded by the golden fumes.

It is true that carbonate of lime, tallow, and many other compound substances, cannot be evaporated without undergoing decomposition—that is to say, they are decomposed at temperatures below their boiling points. It is, however, a significant fact, that if carbonate of lime is sealed in a tight gun-barrel, it is melted without decomposition. All known truths seem to point to the general conclusion that every substance in nature may, under proper conditions of temperature and pressure, be made to assume all three states of matter—the solid, liquid and gaseous. Even waiving this general conclusion, there appears to be no rational distinction between gases and vapors. The fact that as vapors recede from their point of condensation they approach more nearly the permanent gases in their ratio of expansion, strengthens this conclusion. As ice is water in the solid state, so steam is water in the gaseous state.

Gmelin, in his great work on chemistry, a trans lation of which has been published in 16 volumes by the Cavendish Society, makes the statement, that if all pressure was removed, all bodies would take the gaseous from at all temperatures. If a body were isolated in space, the instant any portion of it was evaporated, the vapor or gas would surround the body as an atmosphere, and would exert a pressure from the gravity of the body. We suppose, of course, that Gmelin means that this pressure should be removed as well as all others. The statement is made positively and directly as if the fact were a manifest result of the known properties of matter.

The Circular Saw Question.

We have given much room to the contributions of correspondents on the running and management of saws, both circular and sash. But, as one of the latest remarks, "there are as many differing opinions as saws," and as all we have received profess to be the result of years of experience, we hardly deem it worth while to copy these conflicting opinions. We have now on hand, among others, three well written communications, two from Wisconsin and one from New York, neither of which we publish, for the reason that they contain no new facts and no practical ideas, which have not heretofore been stated in our columns. The size of teeth, the mode of setting, swedging, and filing, the speed of the saw, end play of the mandrel, and other details of sawing, are subjects of disagreement among sawyers; yet every correspondent claims to make good work. Probably the successful running of saws is to be attributed as much to the good judgment of those having them in charge as to any peculiarity in their build and management.

Safety Valves.

A correspondent writes in relation to safety valves, replying to a communication in a previous issue of this paper, stating that steel springs for the levers of locomotive safety valves are entirely reliable. He says that often there is an undue amount of area given the valve, that portion constituting the seat being too great for that exposed to the action of the steam pressure. For a valve of three inches diameter, he says, the seat should not be over one-fourth of an inch. He gives the following rule, which has before been substantially given in our columns:—"For calculating the required weight for a safety valve, add to the area of the valve opening, the area of the total diameter of the valve seat. Divide the sum by two and one-tenth, and use the product in place of the simple inside diameter, as commonly done. This rule is founded on experience and is reliable."

LIGHTNING FIGURES.—Professor Tomlinson, of King's College, points out, in a letter to the *Times*, that the apparent impressions of trees in miniature, so often observed upon the bodies of persons killed by lightning while standing under trees, are in reality produced by all electrical discharges whether of lightning or from a Leyden jar, and that they have no connection with trees.

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FOR THE WEEK ENDING OCT. 2, 1866.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the SCIENTIFIC AMERICAN, New York.

58,362.—CONDENSER FOR STEAM ENGINES.—John Absterdam, New York City.

First, I claim a condenser for condensing the exhaust steam of steam engines and other steam vessels wherein the vacuum is produced and maintained by the direct action of one or more jets of steam from a steam boiler or generator, thereby condensing the exhaust steam in vacuo, and creating and maintaining a vacuum in said condenser by the direct action of steam instead of the ordinary air pump, substantially as above described.

Second, I also claim a condenser for condensing the exhaust steam of steam engines and other steam vessels, wherein the vacuum is produced and maintained by the direct action of steam aided by the columns of water of injection and discharge, dispensing with the use of the air pump, substantially as herein specified and set forth.

58,363.—SPRING PEN RACK.—James Adair, Pittsburgh, Pa.

I claim the spring pen rack having its springs arranged close together, made self connecting or in continuity, and formed of wire properly curved and having its bed and fastening rod as made, used, and applied, all substantially as and for the purpose set forth.

58,364.—SLIDE LACING AND SHOE FASTENER.—Robert Adams, Cincinnati, Ohio.

First, I claim the jointed slide fastener, C, as constructed and operating for the purpose set forth.

Second, I claim so arranging the lacing, D, that it acts as a guide for tongue, B, and fastener, C.

Third, I claim slide fastener, C, tongue, B, as arranged in combination with lacing, D, as constructed and operating for purposes set forth.

58,365.—PAPER FASTENER.—Chas. L. Alexander, Washington, D. C.

I claim a clasp, constructed substantially as described, whether of two plates or of one plate, so that the attachment is made by the passage of the plate or plates through an incision and the turning down of the plate or plates upon the surface of the paper or other material.

58,366.—SEWING MACHINE.—Jacob F. Andrews, New Providence, Pa.

First, I claim the arrangement of the verge, F, moving on its pivot, 6, in combination with the connecting rod, 4, and cam, E, in the manner and for the purpose specified.

Second, I claim the feed bar, C, when operated by the heel, 5, of the needle bar, B, in combination with the verge, F, and its connecting rod, 4, constructed and arranged in the manner set forth and shown.

Third, I claim the shuttle bar, D, with its pivot, d, and elliptical terminus, U', forming an elliptical opening which surrounds the vertical shaft, G, said shaft having an arm, 9, with or without a friction pulley, 3, at its end, in contact with the inner edge of said ellipsis, U', the whole operating in the manner and for the purpose specified.

Fourth, I claim the treadle, H, with its ears, h, and two connecting rods, M, M, united around the crank pin, i, upon the horizontal driving wheel, all connected in such a manner as to play freely with the motions of the wheel or arm, I, in the manner shown and specified.

Fifth, I also claim in a sewing machine the horizontal fly wheel, or its equivalent, when in connection with a vertical shaft provided with a cam, E, and arm, 9, arranged and operating in the manner set forth.

58,367.—SKATE.—F. W. Arvine, New Haven, Ct.

First, I claim adapting the runner of a skate to serve as a lever in conjunction with clamps, or other fastenings, for securing a skate to the foot, substantially as described.

Second, Pivoting the runner, A, to the foot stand at one end, and providing a latch fastening for said runner at its other end, substantially as described.

Third, Applying the instep and toe straps to a sliding plate, G G', operating substantially as described.

Fourth, The heel spurs, a, in combination with a sliding plate, G G', having toe and instep straps applied to it, substantially as described.

Fifth, The construction of the bottom slide of two portions, G G', which are adapted for adjusting the toe and instep straps of a skate.

58,368.—WATER ELEVATOR.—Emmet R. Austin, Norwalk, Ct.

First, I claim the wheel having the concave rim composed of two parts with an open space between them and the arms, C, constructed as set forth.

Second, In combination with the wheel, constructed as described, I claim the buckets, B, as shown and described.

58,369.—FENCE GATE.—J. S. Benedict, Bedford, Ohio.

I claim the rest, A, in combination with the gate roller, C, and hinge, B, when arranged and operating conjointly as and for the purpose specified.

58,370.—COMPOSITION FOR REMOVING INK FROM TYPE.—A. M. Bouton, Newark, N. J.

I claim the use of the substances in any combination for cleansing purposes, substantially as set forth in the foregoing.

58,371.—MEDICAL COMPOUND FOR HOG CHOLERA.—M. Boyes, Pocahontas, Ill.

I claim the within-described medical compound made of the ingredients and in the proportions substantially as herein described.

58,372.—COTTON-SEED PLANTER.—Frederick H. Brown, Auburn, N. Y.

First, I claim the adjustable nature or character of the machine as to regulate the space between rows, in combination with the cotton-seed planter, as above specified.

Second, In cotton-seed planters, regulating the depth that the seed are deposited.

Third, The mode described of constructing the endless chain, and its combination with the cotton-seed planter, as above set forth.

Fourth, The peculiar movement given to the shaft, X, above described, when used for the purpose above set forth.

58,373.—HOT-AIR FURNACE.—John S. Budd, New York City.

First, I claim the dome, d, pipe, e, and damper, in combination with the two ranges of return pipes, f, at the sides of the furnace connected to the pipe, e, by the lateral connections, g, as and for the purposes set forth.

Second, I claim the air jacket, h, surrounding the fire pot, in combination with the shield, k, for allowing a regulated quantity of heated atmosphere to pass into the gases above the fire for their consumption, as set forth.

58,374.—METHOD OF PRESERVING FLOUR, GRAIN, ETC.—Joseph Carlin, Cincinnati, Ohio.

I claim the mode of preserving flour and grain from souring by suspending masses of unglazed pottery (or its equivalents), within the barrel, bin, or other receptacle, substantially as set forth.

58,375.—SODA FOUNTAIN.—James W. Cahill, Madison, Ind.

First, I claim the cup, U V, made of two portions screwing together and with perforated bottom, W, constructed and operating as and for the purpose described.

Second, The perforated shield, K, extending nearly to the top of the water chamber to keep the ice away from the pump, pump rod and crank.

Third, The branching head, O Y X, provided at the respective ends with the plain nozzle, T, and the soda cup nozzle, T', substantially as described.

58,376.—RUFFLING ATTACHMENT FOR SEWING MACHINES.—Dewitt C. Carey, Baltimore, Md.

First, I claim the curved or segmental guide, A, in the described combination with the bar, B, carrying a ruffling plate, L.

Second, I claim the spring R, when employed in connection with the ruffling plate, L, and bar, B, substantially as and for the purposes set forth.

Third, I claim the connecting strap, T, connected to the head of the needle bar or other suitable needle-operating mechanism, to actuate the ruffling device, substantially as described.

Fourth, In combination with the aforesaid ruffling mechanism, A B L, I further claim the slotted bar, S, and clamp screw, C, for varying the fineness of the ruffling.

Fifth, I claim the spring detent, g, constructed and employed as described to hold the work from being drawn back by the return motion to the ruffler.

58,377.—MANUFACTURE OF WATER-PROOF HOSE.—Edwin M. Chaffee, Providence, R. I.

First, I claim the method substantially as herein described of lining hose of woven or other fabric with india-rubber, gutta-percha, or other flexible and vulcanizable gum on the inside by means substantially such as set forth, or by any other equivalent means.

Second, The use of the tin tube or its equivalent for the purpose herein described.

Third, Strengthening the lining by the longitudinal threads or their equivalent, substantially as described.

58,378.—CORD AND LINE REEL.—H. W. Chamberlain, Jersey City, N J.

First, I claim the reel, A, and two handles, n m, arranged and operating substantially in the manner and for the purpose set forth.

Second, I claim the adjusting or securing slides, I and P, in combination with the reel, A, for securing the handles in the reel as and for the purpose set forth.

Third, The combination of the cord clamp or holder, J j, with a reel adapted to operate substantially as specified.

58,379.—METHOD OF BURNING OIL FOR FUEL.—Robert A. Chesebrough, New York City.

I claim the use of bone black as an absorbent bed for oil when the same is used as fuel.

Second, The combination of bone black and hydrocarbon or other oils for use as fuel.

58,380.—CULTIVATOR.—Edwin Children, Liberty, Wis.

I claim the pivoted draft pole, D, in combination with the pivoted bars, H H, lever, G, and the plow beams, L L, connected to the bar, I, which is pivoted to the bars, H H, all arranged substantially as and for the purpose set forth.

58,381.—MACHINE FOR PLANTING COTTON SEED.—John G. Clark, Middletown, Ohio.

I claim, First, The toothed cylinder, B, in combination with the toothed reciprocating slide or slides, constructed arranged and operating in the manner substantially as described.

Second, The combination of the agitator with the cylinder, B, and ribs, e e, operating substantially as specified.

Third, The hopper teeth arranged tangentically in relation to the cylinder in combination with the positively operating devices for separating and discharging the seed, substantially as and for the purpose described.

58,382.—LIGHTNING ROD.—Henry B. Comer and John Denton, Pittsburgh, Pa.

We claim a new article of manufacture, to wit: a lightning rod consisting of a central core from which extend two thin wings, said core and wings being made in one piece and twisted, the whole being made by means and constructed in the form substantially as herein described and for the purpose set forth.

58,383.—CULTIVATOR.—James Cook, Collinsville, Ohio.

I claim, First, The intermediate frames, A and a a', constructed in the manner described in combination with the standards, d and d', beam, B, and drag bars, f, arranged, connected and operating in the manner and for the purpose specified.

Second, The upper frame, a a', and spring connection b, in combination with the plow handles and notches or gains, to limit the oscillating motion of the plows, in the manner and for the purpose substantially as described.

58,384.—GANG PLOW.—Thomas J. Cornell, Decatur, Ill.

I claim, First, The plow standard, I, journaled on a horizontal axis, K, to vibrate rearward, under the circumstances described.

Second, The catch, Q, in combination with the standard, I, operating as described.

Third, The spring, R, in combination with the standard, I, operating as described.

Fourth, The eccentric segment, W, in combination with the beam or beams of the plow, and operating substantially as described.

58,385.—POTATO DRILL.—John Croco, Holmesville, Ohio.

I claim the hopper, E, the spout, M, the bar, N, the spring, d, and knobs, g, the whole constructed and arranged as and for the purpose herein specified.

58,386.—GANG PLOW.—H. N. Dalton, Pacheco, California.

I claim, First, The plow frame, F, parallel arms, E, beam, H, links, J C, vertical bar, I, and pins, d e, combined and operating substantially as described for the purpose specified.

Second, The lever, J, arms, E E, beam, H, and frame, F, combined and operating substantially as described for the purpose specified.

58,387.—CARVING TABLE.—Royal E. Deane, New York City.

I claim a carving table having a top, A, constructed in the form of a shallow vessel divided by a longitudinal central partition plate, b, one or more, with a space, c, allowed at one end to form a communication between the two compartments, d d', and the latter made to communicate by means of pipes, e e', with the water back or heater of a range or furnace, substantially as herein shown and described.

58,388.—APPARATUS FOR REMOVING THE WIRE FROM SODA WATER BOTTLES.—C. M. Dedrick, Temperanceville, Pa.

I claim the apparatus consisting of the base or lever, A, fulcrum, C, and catching point, B, when said apparatus is used for the purpose of removing wire off the corks of soda or mineral water bottles, the whole being constructed, arranged and operating substantially as herein described and set forth.

58,389.—CULTIVATOR.—G. W. Doolittle, Lincoln, Ill.

First, I claim the form of the plow mold as herein described, for the purpose specified.

Second, I claim the arrangement and combination of the guiding mechanism herein described.

Third, I claim the iron axle, s, and the supporting brace, n, constructed and operating as herein described.

Fourth, I claim the combination of all the parts operating substantially in the manner herein described.

58,390.—FORK FOR DIGGING POTATOES.—Harrison Doolittle, East Cleveland, Ohio.

First, I claim constructing the cross head, A, adapted to receive the tines in the manner described.

Second, I claim the tine, B, constructed as herein described, in combination with the cross-head.

Third, I claim the adjustable support or fulcrum, D, in either of the forms represented, in combination with the handle and shank, C.

Fourth, I claim the employment of the guard rod, E, for the purpose herein specified.

Fifth, I claim connecting the fork into a rake in the manner herein described, and the combination of the fork and rake, for the purposes herein set forth.

58,391.—MAKING HATS.—William E. Doubleday, Brooklyn, N. Y.

First, I claim the ring brim block, b, to which the edge of the felt or other material is to be connected by pins or otherwise, in combination with the crown block applied to stretch the fabric to shape, as set forth.

Second, In combination with the brim ring and crown block, I claim the brim block or its equivalent to connect the brim ring and crown block, so that they may be removed and retain the hat or similar article while cooling or drying, as set forth.

Third, I claim the method herein specified of forming or shaping hats and bonnets by heating and softening the felt or other material by steam and then stretching and shaping said fabric at one operation by blocks, before it cooks or dries, substantially by the means set forth.

58,392.—LANTERN.—A. M. Duburn, Chicago, Ill.

First, I claim the arrangement of the globe, G, as shown, so that it may rest on spring supports and be capable of being drawn through the band, C, when desired.

Second, The wick adjusting mechanism composed of the two rods, k m, fitted respectively in the lamp burner and band, C and provided with the square, l, and three sided socket, n, all constructed, combined and arranged as shown, to admit of the wick being raised and lowered without removing the lamp from the lantern and at the same admitting of the removal of the lamp whenever desired.

58,393.—SCREEN FOR DRY GAS PURIFIERS.—Edward Duffee, Haverhill, Mass.

I claim, in a screen for dry coal gas purifiers, made up of crossed or interlaced thin strips of wood, supported by a frame-work, grooving the outer edges of each frame, so that the strips shall be imbedded in or sunk below the surface of each outer edge, to prevent abrasion, and to allow the frames to abut closely together, substantially as set forth.

58,394.—BED BOTTOM.—F. B. Duffy, Sparta, Wis.

I claim a spring bed bottom, consisting of the slats, c, resting at their ends on the elastic strap, E, secured to the bar, a, by the staples, e, and the whole secured to the bedstead by means of the hooks, m, and staples, o, as set forth.

58,395.—PLOW.—J. B. Edgell, J. W. and E. A. Alexander, Independence, Iowa.

First, We claim the construction of a plow carriage for supporting plows, of the axletree, A, wheels, B, beam, c, seat, c', beam, D, pivoted pole, G, hand lever, H, and connecting rod, g, substantially as described.

Second, The pendant, E, applied to the beam, D, of an adjustable plow carriage, which is constructed substantially as described.

Third, Pivoting a plow to an adjustable beam of a carriage, so as to operate substantially as set forth.

58,396.—COFFEE POT.—William Edson, Boston, Mass.

I claim, as an improved article of manufacture, a coffee pot provided with a fixed diaphragm, E, pipe, P, strainer, F, and otherwise made as shown and described, and for the purpose set forth.

58,397.—AIR ENGINE OR MOTOR.—Peter A. Ensign, Adrian, Mich.

First, I claim the combination and arrangement of the cylinder, A, suitably elevated, wind wheel, D, vertical shaft, E, shaft, K, perforated stationary tube, J, governor, H, valve, F, and heater, B, substantially as described, for the purpose specified.

Second, I also claim the heater, B, and stove, C, arranged alongside of and connected to the cylinder, as above described, in combination with the said cylinder, and the wind wheel, substantially as shown.

58,398.—OVEN FOR GAS COOK STOVE.—Luther Irving, Brooklyn, N. Y. Antedated September 23, 1866.

First, I claim the inverted conical deflector, E, when used in connection with an oven, F, and a gas burner, substantially as and for the purpose set forth.

Second, Constructing the oven with double walls to form flues or draft passages, when said oven is provided with a deflector, E, arranged relatively with the draft passages, so as to guide or deflect the products of combustion into the flues, and at the same time admit of the heat from the flame rising directly into the oven, as set forth.

Third, The shelves, G, in the oven, F, arranged in such a manner that they have open spaces on every side to allow the heat to pass, in the manner and for the purpose described.

58,399.—SEWING-MACHINE SHUTTLE.—Frederick Etzold, Union Hill, N. J.

I claim the toothed eccentric cam, D, applied in combination with the spring, C, and in relation with the bobbin, B, and shell, A, of the shuttle, substantially as herein set forth for the purpose specified.

58,400.—PRIVY.—D. S. Forney, Wytheville, Va.

First, I claim the portable receptacle, F, for excrementitious deposits, in combination with the box, W, connected by a pipe or tube to the receptacle, F, and provided with the cover, L, and lids, d, the whole being constructed, arranged, and operated as described.

Second, A swinging cover, M, or its equivalent, so arranged upon the excrement receptacle that it can be either swung away from or over its mouth, by means substantially as and for the purpose specified.

Third, The box cover or lid, M, having its bottom perforated or made of wire netting, for the purpose specified.

Fourth, The swinging cover or lid, S, for the seat opening of the privy, operated as described, whether arranged to swing in conjunction with the cover of the excrement receptacle or not.

58,401.—HAY AND GRAIN PROTECTOR.—Andrew J. Frisbie, St. Mary's, Ohio.

I claim the longitudinal hay and grain cap, as herein described.

58,402.—OAR SWIVEL.—Martin Fryer, Greenbush, N. Y.

I claim the combination of the swivel, A, with the ring, B, and its slot, b, and the ring, C, with its pin, e, operating together in the manner and for the purpose described.

58,403.—SURGICAL SPLINT.—Richard J. P. Goodwin, Manchester, N. H. Antedated September 24, 1866.

First, I claim the adjustable band, D, one or more, between the stationary bands, B, or B', in combination with the guide rod, a or a', constructed and operating substantially as and for the purpose described.

Second, The segmental slots, c, and set screws, d, in combination with the hinge joints, C, which connect the two parts of the splint, A, substantially as and for the purpose set forth.

Third, The arrangement of hinge joints, h, in the middle of the bands, B B' D, or nearly so, substantially as and for the purpose described.

Fourth, The application to the bands of waterproof pads, substantially as and for the purposes set forth.

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58,404.—Fish Hook.—W. C. Goodwin, Hamden, Conn.

I claim the combination of the fish hook with the spiral or helical spring, when they are constructed, put together, and made fit for use, substantially as herein described.

58,405.—Door and Gate Spring.—John C. Gould, Boonton, N. J.

I claim the plate, D, spring, F, or its equivalent, lever, G, arm, H, with the guides, I and M, and the notch, J, substantially as set forth and for the purposes named.

58,406.—Elevator for Ladies' Skirts.—Christian Grun, New York City.

I claim the mortises, a a' b, in the V-shaped bed plate, A, in combination with the eyes, c, on the spring jaws, and with the spring, e, constructed and operating substantially as and for the purpose set forth.

58,407.—Belgian Pavement. — Charles Guidet, New York City.

I claim the employment of rhomboidal blocks, in which the angles are unequal, and the planes of thin sides are not at right angles, arranged substantially as and for the purpose set forth.

58,408.—Melting and Molding Tinners' Solder. —D. Hagerty, Baltimore, Md.

I claim the combination of recess, E, with its interior furnace, e, and gate, G, mold plates, B B, toothed wheel, C, and tube, A, constructed and arranged in the manner substantially as shown and described, and for the purpose set forth.

58,409.—Lubricating Apparatus.—William Hamilton, Chicopee, Mass.

I claim an oil cup divided into separate compartments, as described, when said cup is combined with a chain or ring, B, by means of which the oil is carried up to lubricate the axle or shaft, in the manner and for the purpose herein described.

58,410.—Mode of Ornamenting and Lettering Glass.—Thomas R. Hartell, Philadelphia, Pa.

I claim ornamenting and lettering glass objects by making depressions in the same while the glass is in a plastic state, and filling or lining these depressions with white plaster while in a plastic state, as and for the purpose set forth.

58,411.—Snow and Ice Guard for Roofs of Buildings.—S. R. Hathorn, Castleton, Vt.

First, I claim a snow and ice fender, composed of the supporting pieces, D, and fender rods, e, and combined together substantially as and for the purposes set forth.

Second, I claim the snow and ice fender, constructed and arranged substantially as herein described, so that it may be secured to the roof of a building before the shingles or slates are put on, as set forth.

58,412.—Horse Hay Rake. — Jerrah Hayward, Greene, N. Y.

I claim the combination of the lever, F, to the lever, E, main braces, C C, pitman, D, and rake B, when made and operated substantially as and for the purposes set forth.

58,413.—Ditching Machine. — Edward Heath, Fowlerville, N. Y.

First, I claim the ditching machine, so constructed as that the cross head will impart a longitudinal motion to the excavator and a lateral motion to the scraper at the same time, substantially as and for the purposes herein described.

Second, I claim the cross head, J, pitman, I, and crank, H, in combination with the bar, E2, lever, H2, and ratchet wheel, C2, all for the purposes and substantially as herein set forth.

Third, The excavator, S, pitmen, L L, in combination with the spring catch, T, and rock shaft, P, substantially as and for the purpose described.

Fourth, The scraper, R, in combination with the excavator, S, for the purposes and substantially as described.

58,414.—Fastening for Neckties.—H. M. Heineman, Williamsburgh, N. Y.

I claim the fastening, A, consisting of the two jaws, B and C, and clasp or slide, E, arranged and connected together, and constructed so as to operate substantially in the manner and for the purpose specified.

58,415.—Churn. — Joshua Henry, Stenbenville, Ohio.

I claim the arrangement of the metal tube, d, passing through the journal, c', and into and beyond the bottom of the funnel, a, when used in combination with the revolving churn box, A, substantially as and for the purposes specified.

58,416.—Apparatus for Discharging Bilge-water from Vessel Holds.—Augustus Hermann, New Haven, Conn.

I claim the apparatus, substantially as described, consisting of a vertical axle, I K, to which is attached a hollow cylinder, R R, with projecting chambers, T T T, containing valves, U U U, which open on the said axle and hollow cylinder being rotated, said apparatus being operated in the manner substantially as described for the purpose of freeing vessels from water.

58,417.—Cap for Mucilage Bottle.—Thomas N. Hickcox, Brooklyn, N. Y.

I claim the sheet metal cap for mucilage bottles, etc., formed with a spring flanged hole for the brush handle, as and for the purposes set forth.

58,418.—Car Coupling.—Chas Holtz, Chicago, Ill.

First, I claim so arranging the coupling pin, in combination with the adjustable or movable bumpers, D, or their equivalent, that pressure upon said bumpers will raise up the coupling pin, and allow the coupling link to enter the draw head when the cars are run together.

Second, I claim so arranging the springs, S, or their equivalent, in combination with the coupling pin, that said pin is caused or permitted to drop through the coupling link to couple the cars when pressure upon the aforesaid bumpers is renewed.

Third, I claim the combination of the bumpers, D, the movable bar, E, the pin, d, sliding bar, c, bent lever, b, and coupling pin, a, arranged and operating substantially as specified and shown.

Fourth, I claim the combination and arrangement of the bumpers, D, cross bar, E, springs, S, pin, d, slide, c, lever, b, and pin, a, operating substantially as specified and set forth.

Fifth, I claim, in combination with the pin, a, bent lever, b, and slide, c, the employment of a projection, e, and hook, g, for uncoupling the cars, substantially as specified.

Sixth, I claim, in combination with said slide, e, the employment of a spring, h, as and for the purposes described and shown.

Seventh, I claim the employment of the levers or arms, H, and cord, I, in combination with the shaft, f, and hook, g, arranged and operating as and for the purpose set forth.

58,419.—Clothes-line Clamp.—Charles W. Howard, Philadelphia, Pa.

I claim a device for supporting a clothes line, consisting of the pieces, A and B, or their equivalents, constructed and combined to operate together so as to pinch and hold the line by the tensional strain of the latter, substantially as described and set forth.

58,420.—Stamp Moistener.—H. A. Hoyt, Mott Haven, N. Y.

I claim an improved stamp moistener, formed by combining the spring, B, and screw, C, constructed and arranged with the sponge, D, and sponge cup, A, substantially as described and for the purpose set forth.

58,421.—Composition for Paint.—William C. Hurd, New York City.

I claim a composition for painting compounded by the addition of powdered quartz to oil, lead, zinc, and other materials ordinarily employed in the manufacture of paints, substantially as set forth.

58,422.—Automatic Feed for Carbureters.—Elias S. Hutchinson, Baltimore, Md.

I claim a valve to regulate the supply of liquid from the reservoir to the chamber which is operated from the revolving shaft or a projection thereon, which strikes against an object brought within reach by the sinking of the fluid in the chamber.

58,423.—Composition for Destroying Insects.—George M. Jacques, Boston, Mass.

I claim the combination of extracts, solutions, and distillations of tobacco, including the nicotine oils, and ammonia, and soaps, in the manner and for the purpose above described.

58,424.—Sadiron Heater.—Eugene N. Jenkins, Chicago, Ill.

I claim the wire with the feet, f, bend, g, and end, h, constructed substantially as and susceptible of being operated in the manner and for the purposes herein recited.

58,425.—Process of Seasoning Wood.—Barton H. Jenks, Bridesburgh, Pa.

I claim the process, substantially as herein described, of seasoning or drying wood.

58,426.—Oyster Rake.—Job Johnson, Brooklyn, N. Y.

First, I claim the lever in combination with a pair of rakes, hinged together substantially as specified, for keeping the rakes apart as they are lowered, and allowing the rakes to close after they touch at the bottom of the water, as set forth.

Second, I claim a line or cord passing from the end of one handle to the rake on the other handle, for opening the rake when it becomes necessary to disconnect the same from any article in the water, as specified.

Third, I claim the mode of constructing the metallic rake head with the angle iron receiving the teeth clamped to the same, substantially as set forth.

Fourth, I claim the metallic fenders formed of the bars, a, and rods, u, the parts being united to the rake head, e, in the manner specified.

58,427.—Watch.—Thomas Johnson, Elmira, N. Y.

First, I claim the combination and arrangement of the cock, with the plate and its pillar and pin, when said pin is inserted in a direction running lengthwise with the cock, substantially as herein shown and described

Second, The combination and arrangement of the hair spring stud with the segment screw, e, when constructed and operating substantially as herein shown and described.

Third, The combination of the arms or levers, f g, with the hair spring, d, constructed and operating substantially as herein shown and described.

Fourth, The combination and arrangement of the clicks and springs with their ratchet, constructed and operating substantially as herein shown and described.

Fifth, The arrangement of the clicks and click springs combined, and ratchet, with the b idge or cap inclosing them, substantially as herein shown and described.

Sixth, The combination of the face ratchet, u, with the stop work, constructed and operating substantially as herein shown and described.

Seventh, The male stop, p, when constructed with a lip, s, stud, q, and beveled slots, o' o', as herein shown and described.

Eighth, The hook and auxiliary stop work, x, constructed and operating substantially as herein shown and described.

Ninth, The arrangement of the teeth upon the center of the periphery of the barrel containing the main spring, substantially as herein shown and described.

Tenth, The combination of a suspended cap jewel, by means of an elastic bearing, with a pivot, substantially as herein shown and described.

Eleventh, The construction and arrangement of the jewel in the spring, a", substantially as herein shown and described.

Twelfth, The method of forming in a watch movement suspended elastic end bearings to the pivot, substantially as herein shown and described.

58,428.—Card Rack.—James M. Keep, New York City. Antedated September 18, 1866.

First, I claim the springs for holding cards, when constructed and arranged relatively to each other, and to the tablet or other surface to which they are secured, as herein described, so that each spring shall bear upon the swell or crown of the succeeding spring, immediately above, as and for the purposes set forth.

Second, I claim the combination in a card rack of the springs, constructed and arranged as above described, with the frame, A, bars, B, and alphabetical reference or tablet, substantially as hereinbefore shown and set forth.

Third, I claim constructing a card rack of separable and detachable parts, as described, and so that said rack may be easily taken apart and readily readjusted, substantially as and for the purposes herein set forth.

58,429.—Billiard Register.—O. W. Kellogg and H. R. Hill, Ripon, Wis.

First, We claim the dial plates, A A, with disks, D D, bar, M, ratchet, E, and pendulum, F, arranged in the manner substantially as and for the purposes herein specified.

Second, The pendulum, F, attached to the count wire when used as and for the purposes set forth.

58,430.—Belt Buckle.—George R. Kelsey, West Haven, Conn.

I claim the combination of the bow, Fig. 3, lever, Fig. 4, and hook, Fig. 5, when they are constructed, put together, and fitted for use, substantially as herein described and set forth.

58,431.—Plow.—Isaac Kennedy, Ithaca, N. Y.

First, I claim making the wheel at the rear end of the mold board adjustable by means of a frame or other devices at the top and bottom of the said wheel, one or both, by means of which I am able to evert, set on edge, throw completely over, or otherwise regulate the furrows by the use of the said wheel and frame as described.

Second, I claim the combination of the wheel or equivalent device and frames, with the mold board, and the V-shaped handles meeting in one eye on the land-rest, the same making a whole as described.

Third, I claim the so combining together the wheel and the immovable part of the mold board, and shaping each to the other that they shall maintain a constant relation to each other in whatever position the wheel may be placed, as described.

58,432.—Fence.—George Kicherer, Brooklyn, N. Y.

I claim as a new article of manufacture the panels, fitted with staples or eyes for the reception of the rods or braces, substantially in the manner described and for the purpose specified.

58,433.—Let-off and Take-up for Looms.—John F. Kirkwood, Thistle, Md.

First, I claim the combination of the lever, V, and spring, U, with the whip roll, T, arm, S, and rod, Q, for the purpose of increasing the speed of the let-off devices conformably with the decrease of thread upon the yarn beam, substantially as described.

Second, I claim the arrangement of the lever, F, cam, E', and arm, P, for imparting motion to both the let-off and take-up mechanism, as described.

58,434.—Machine for Twisting, Stretching, Cleaning and Reeling Silk and other Threads.—Tobias Kohn, Hartford, Conn.

First, I claim the combination of the mechanism for twisting with the means for stretching and the mechanism for cleaning, substantially as described.

Second, I also claim the combination of the mechanism for twisting with the means for stretching and the mechanism for reeling, substantially as described.

Third, And finally, I claim the combination of the mechanism for twisting with the apparatus for macerating, the means for stretching, the mechanism for cleaning, and the mechanism for reeling, substantially as described.

58,435.—Drilling and Quarrying Stone, etc.—Ebenezer G. Lamson, Shelburne Falls, Mass.

I claim connecting the chisels, drills, or other cutting instruments for working in or on stone, to the crank wheel, or its equivalent raising and lowering mechanism, through the intervention of a bow string and strap, substantially as and for the purpose described.

I also claim, in connection with a stone-cutting, channeling, tunneling or quarrying machine that is moved along upon a track or ways while operating upon the rock or stone, a reversible pawl, the worm gear, and clutch, so that it may be moved along in either direction upon the track, or stopped thereon at will while the cutter or tools continue to operate, substantially as described.

58,436.—Hollow Auger.—James Lefeber, Cambridge City, Ind. Antedated August 23, 1866.

I claim a hollow auger, substantially as above described, with radial wings on the exterior of its body, and with bits or cutters fastened adjustably to such wings, as above shown.

58,437.—Bedstead Fastening.—John Lemman, Cincinnati, O.

I claim inserting in a bedstead post a segment of circle, B, in a mortise with beveled sides and lower end, for the purpose of securing it to the post, A, without any other fastening, substantially as described.

58,438.—Pick and Ax Combined.—H. L. Lowman, New York City.

I claim as a new article of manufacture a compound tool, consisting of an ax and pick united, the eye being of elliptical form, and of even size throughout its length, as described and represented.

58,439.—Induction Coils for Electro-magnets. —J. B. Lyon and Arnold Doll, Cleveland, O.

First, We claim making the coil for the main or direct circuit of two wires of dissimilar metals, as copper and iron laid side by side in alternation, as specified.

Second, We claim laying the coil for the induction current in two sections, of about equal length of wire, one section being upon the core of the coil, and the other upon the outside of the main coil, the two sections being of one continuous wire, as herein set forth, in combination with a primary coil composed of dissimilar metals, as specified.

58,440.—Skate. — Andrew Mabon, Philadelphia, Pa.

I claim a skate having a projection, d, hinged plate, f, and recess y, adapted for the reception of a pin on the boot to which the skate is to be attached, the whole being constructed substantially as described.

58,441.—Fastening for Window Blinds.—Francis A. Makepeace, Worcester, Mass.

First, I claim the construction and arrangement of the double spring jaws, when constructed and operating substantially as set forth.

Second, The locking plate in connection with the double jaws, when constructed and operating in the manner and for the purposes substantially as set forth and described.

58,442.—Lifter for Stove Covers, etc.—Sidney Maltby and J. R. Brown, Dayton, O.

First, We claim a stove lifter composed of the parts B B', and jaws, D D and E E, constructed and arranged as and for the purpose shown.

Second, Providing one jaw in each set with ribs.

Third, The hooks on ends of reins in combination with the reins and jaws, all substantially as and for the purposes set forth.

58,443.—Safety Gun Lock.—James E. McBeth, New Orleans, La.

First, I claim the cocking trigger, B, formed with the curve, b, in combination with the hammer, A, formed with the curve, a, substantially in the manner and for the purposes hereindescribed.

Second, I claim the notch, h, and spring, k (on B), with the projecting point, o (on D), and the projecting point, p (on C), substantially in the manner and for the purposes herein described.

Third, I claim the combination of the notch, h, spring, k, projecting points, o and p, sear, c, sear spring, F, trigger, D, and trigger, B, substantially in the manner and for the purposes herein described.

Fourth, I claim the combination of B and C, substantially in the manner and for the purposes herein described.

Fifth, I claim the combination of the several parts, A, B, C, and D, substantially in the manner and for the purposes herein described.

58,444.—Breech-loading Fire-arm.—Reuben McChesney, Ilion, N. Y.

First, I claim lifting a swinging breech piece from an open to a close position entirely by the immediate action of the hammer or of some projection thereof, without any intermediate device, substantially as herein specified.

Second, I also claim the relative arrangement and combination of the breech piece and hammer, in such a manner that the breech piece may descend by its own weight and open the breech before the hammer reaches half cock, and be raised again to close the breech while the hammer is passing from half cock to full cock, substantially as and for the purpose herein set forth.

Third, I also claim the combined arrangement of the breech piece, locking bolt, or its equivalent, and the hammer, in such manner that the breech piece shall be held locked independently of the hammer during the entire descent of the latter, then unlocked by the action of the hammer before the same reaches half cock in ascending, and again locked by the action thereof at or before reaching full cock.

Fourth, I also claim the sliding firing pin, q y, arranged to slide in the side of the breech piece, substantially as above described.

Fifth, I also claim the dog, g, of the hammer piece of the bolt, F, substantially as and for the purpose above described.

Sixth, I also claim the dog, 6, in combination with the pendent plate, f, of the sliding bolt, F, substantially as and for the purpose above described.

Seventh, I also claim the hook, p, of the hammer, in combination with the firing pin, constructed and operating substantially as and for the purpose above described.

Eighth, I also claim the mode above described of securing the end of the main spring, to wit: by fitting its end in a groove on the screw pin, n, in combination with the projection, 8, and recess, 7, substantially as above described.

58,445.—Tie for Cotton Bales.—John McMurtry, Lexington, Ky.

I claim the hoop-iron cotton bale tie, A, constructed and operating in the manner and for the purposes herein set forth.

58,446.—Device for Griping Screw Blanks.—Dustin F. Mellen, New York City.

First, I claim a hollow spindle in which forceps or some other analogous device is placed, made in two parts by a longitudinal division, substantially as and for the purposes set forth.

I also claim the adjustable fulcrum, 8, for the adjustment of the forceps regulated by the screw nut around the spindle, by which it is shifted and held, substantially as and for the purposes set forth.

I also claim inserting folding springs, 6, within the spindle, to open the jaws of the forceps, constructed, arranged and combined with the forceps and spindle, as and for the purposes set forth.

I also claim the hardened steel bearing, 10, combined with the spindle and box, 12, substantially as herein specified.

I also claim the hardened bearing and box, 15 and 16, in connection with a forward bearing that will not allow end chase, constructed and arranged substantially as and for the purposes specified.

I also claim the sliding ring, 18, and hardened ring, 19, for closing the forceps, substantially as herein set forth.

58,447.—Mode of Attaching Tires to Wheels of Locomotive.—Edward Mellon, Scranton, Pa.

I claim the wheel with the curved flange upon the inner edge, in combination with a tire with a rounded corner to fit said curved flange, as set forth.

58,448.—Construction of Iron Railroad Cars. —S. Merrick, New Brighton, Pa.

I claim an iron railroad car, having its panels, F, secured in position by metal stanchions, C D, provided respectively with a groove, a, and rib, b, and connected together, and to wooden stanchions, B, by bolts, E, substantially as herein shown and described.

57,449. — Cask, Barrel, etc. — Joshua Merrill, Boston, Mass.

I claim as of my invention and improvement in casks, barrels, and kegs, in combination with the joints of a cask suitable for holding and transporting liquids, having the common straight or

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plain joints, a coating or stuffing of glue or similar gelatinous cement applied to the joints before putting the cask together, substantially as described.

58,450.—Cask, Barrel, etc.—Joshua Merrill, Boston, Mass.

I claim the improved cask, substan ially as described, having lapped joints formed by a lip and rebate, substantially in the way and for the purposes described.

In combination with the lapped joints of lapped-jointed casks, substantially as described, a coati g or stuffing of glue, or similar gelatinous cement, applied to the lapped joints, substantially as described, whereby said joints are firmly glued or cemented together.

In combination with the lapped joints of lapped-jointed casks, substantially as described, a coating or stuffing of shellac, rosin, or other similar resinous cement, applied to the lapped joints, substantially as described, whereby the lapped joints are more securely protected against leakage.

58,451.—Cask, Barrel, and Keg.—Joshua Merrill, Boston, Mass.

I claim as my invention and improvent in casks, barrels, and kegs used for holding and transporting liquids, the improved cask, substantially as described, having its joints made with two or more tongues, and two or more corresponding grooves at each joint, substantially in the way and for the purposes hereinbefore described.

In combination wit i the joints, a cask having its joints made with two or more tongues, and two or more corresponding grooves to each joint, and a coating or stuffing of glue, or similar gelatinous cement, applied to the said joints, substantially as and for the purposes described.

In combination with the joints of a cask having its joints made with two or more tongues, and two or more corresponding grooves to each joint, a coating or stuffing of shellac, rosin, or similar resinous cement, applied to the said joints, substantially as and for the purposes described.

58,452.—Barrel and Keg.—Joshua Merrill, Boston, Mass.

I claim, in combination wit the joints of a cask, suitable to hold and transport liquids, having plain or straight joints, a coating or stuffing of shellac, rosin, or other similar resinous cement, applied to the joints, and substantially in the way and for the purposes described.

58,453.—Combined Foot Warmer and Reflecting Lamp.—Charles S. Merwin and Charles A. Metcalf, Dubuque, Iowa.

First, We claim the employment, in a combined foot stove and lantern, of a reflector, C, substantially as and for the purpose specified.

Second, We claim the combination of the glass plate, d, the lamp, c, and reflector, c, substantially as specified.

58,454. — Prepared Paste. — Samuel Merwin, Springfield, Mass.

I claim, as a new article of manufacture, the substance herein described.

58,455.—Spice Box.—Wallace A. Miles, Meriden, Conn.

I claim the covers, A, having perforations in a radial line, registering with the slotted cover, B, of a box, operating substantially as described for the purpose specified.

58,456.—Dust and Shaving Conveyer for Planing and Sawing Machine.—David R. Miller, Harrisburg, Pa.

I claim the conveyer, A, made of metal or wood, provided with the hooks, F F, flanges, C and D, with opening, B, when constructed substantially as described, and used for the purposes herein specified.

58,457.—Sand Pump.—Bernard Morahan, Brooklyn, N. Y.

I claim the split-linked piston rod, E, in combination with the piston, C, operating with the bail, B, firmly secured to the cylinder, B, as and for the purpose specified.

58,458.—Paint for Ship's Bottom.—G. W. Morse, New York City.

I claim a paint composition made of the ingredients above specified.

58,459.—Lamp.—Charles Mulchahey, Springfield, Mass.

I claim the application to an oil lamp, of an absorbent or retaining material, around outside of the tube, c, substantially in the manner and for the purpose described.

58,460.—Spider.—Jonas Mull and Asa D. Reed, Troy, N. Y.

We claim the employment of a spider, for culinary purposes, constructed with an outward projecting flange, I, with aperture, D, upon the upper edge thereof, and with the projections, G', so as to suspend the said spider back of the center thereof, in combination with the outer rim, A, and surrounding or annular chamber, A', each being arranged in the manner substantially as herein described and set forth.

58,461.—Fastening for Window Blind.—Hezekiah Munroe, Fall River, Mass.

I claim the combination of the two plates, H and I, when constructed and connected together so as to operate substantially in the manner described and for the purpose specified.

58,462.—Folding Table.—G. W. Nellis, Richmondville, N. Y.

I claim the table having a folding top, A, slides, K, sockets, L, hinged legs, H, brace rod, g, and button, I, arranged and operating substantially as described for the purpose specified.

58,463.—Alphabet Frame.—E. B. Nourse, Eaton, Ohio.

I claim the frame, constructed as described, having spring pads connected by link, or equivalent, to shutters, covering letters, and operating substantially as described and represented.

58,464.—Loom for Weaving Narrow Wares.—Benj. Oldfield, Newark, N. J.

I claim, First, Making the racks, f, adjustable by means of movable strips, or any other equivalent means which will produce the same effect, for the purpose of throwing them out of gear with the pinions, c, as set forth.

Second, Supporting the sleys or reeds, C, by springs, which will allow of depressing said reeds, for the purpose of removing them, as desired, substantially as described.

58,465.—Carriage Shackle.—John H. J. O'Neill, New Haven, Conn.

I claim the combination of the base, A, and the lever, C, hinged thereto, with a cam, F, pivoted to the base, A, constructed and arranged to operate substantially in the manner and for the purpose specified.

58,466.—Apparatus for Holding Paper Ribbon.—William Orr, Jr., and George F. Wright, Clinton, Mass.

We claim the use of the shears, f, or any device which will sever paper in connection with the paper ribbon, a, and paste rolls, d, above mentioned, as and for the purpose specified and shown.

58,467.—Fastening for Trunks, Boxes, etc.—W. S. Paddock, Albany, N. Y.

I claim the combination of the plates, A B C, with the lock, D, all constructed and arranged substantially as herein described, and constituting a fastening for trunks, bags, valises, and boxes.

58,468.—Packing for Deep Well Tube.—J. J. Parker, Marietta, Ohio.

I claim, First, The sleeve, F, pin, g, and slot, m, in combination with the safety band, H, in the manner described.

Second, The outer and inner tubes, A B, the bands C, and the inner metallic sheet, D, in combination with the tube, E, in the manner and for the purpose described.

58,469.—Well Packing.—J. J. Parker, Marietta, Ohio.

I claim the tube, A, in combination with the expansible metal case, B, and lining, C, all substantially in the manner and for the purpose described.

58,470.—Machine for Making Dies for Braid and Embroidering.—J. J. Parker and E. D. Parker, Marietta, Ohio.

We claim, First, The sliding cutter, D, and stationary cutter, E, in combination with moving arms, B, or bar, or their equivalents, by which the pins or wire are set and cut, as set forth.

Second, The turn table, L, set in the frame of the stamping machine, and used to regulate the width of the blocks, and the length of the wires constituting the stamps, in the manner described.

58,471.—Apparatus for Carbureting Air, etc.—Andrew Patterson, Birmingham, Pa.

I claim the combination and arrangement of the divisions, c c c, within the adjustable inclined pan, a, with their alternate submerged passages, d d d, the whole being arranged and applied substantially in the manner and for the purposes set forth.

58,472.—Cleansing Sorgo Sirup.—P. Perdew and H. A. Perdew, Seal, Ohio.

I claim, First, The use of two or more filter boxes for the purpose of cleansing sorgo sirup.

Second, The downward and upward flow of the sirup in passing through, as set forth.

Third, The combination of the filter boxes, below the apron, with the other filter boxes, for the purpose set forth.

58,473.—Apparatus for Cutting and Stamping Soap.—Harvey Alvah Phelps, Albany, N. Y.

We claim, First, The mode herein described for cutting and stamping soap, substantially as set forth.

Second, We claim the arrangement of the feed guide, E, cutting frame, F, sliding transversely to said feed guide, in combination with the stamping bar, H, and edging knives, f f, the whole constructed and arranged in order to operate as set forth.

Third, We claim the employment of a cutting wire, a, tensioned in a transverse sliding frame, F, when used in combination with an intermitting feed as shown and described and for the purpose specified.

58,474.—Grate Bar.—Charles W. Pierce, Albany, N. Y.

I claim a compound grate made by the combination of an upper grate, D, formed as shown, resting by its outer bars upon the entire upper surface of the outer bars of a lower grate, A, formed as shown, the grates being held to each other by dovetailed joints formed along the outer edges of their outer bars, at f, in the manner and for the purposes set forth in this specification.

58,475.—Storing Petroleum, etc. — Emmett Quinn, Washington, D. C.

I claim a dock or crib with its appurtenances, in which to store petroleum or other oils in barrels or casks, constructed and used in a manner substantially as described.

58,476.—Cultivator. — Jacob K. Reiner, Line Lexington, Pa.

I claim the bars, G G', having the handles, H H, attached and connected by the screw, J, provided with the nut, K, in combination with the bars, F F, attached to the inner sides of the beams, and passing through eyes, a, at the end of a bar, L, secured to the under side of the front bar, G, with the clamp bar, M, attached to the under side of the rear bar, G', all arranged substantially as and for the purpose set forth.

58,477.—Heating Stove.—William Resor, Cincinnati, Ohio.

I claim the arrangement of oval fire chamber, A B C, interior descending flue, E, bottom flue, F, neck, G, external descending flue, H, collar, J, and registered draft inlet, K L, substantially as and for the purpose set forth.

58,478.—Steam Engine.—George H. Reynolds, New York City.

First, I claim the rods, D, arranged as represented relatively to the cylinder, E, cross head, F, bed piece, C, and binders, C', so as to receive the crushing and rending strain between the cylinder and the binders in the line of their axes, as herein set forth.

Second, I claim arranging the link, H, to hold the link block rigidly in the desired position thereon, substantially in the manner and for the purposes herein set forth.

Third, I claim the pinion, O, carried on the link block, in combination with the rack, h, on the link, and with means for confining the link firmly to the block in any desired position, so as to prevent loose play between the parts while the engine is working, substantially as and for the pur ose herein set forth.

Fourth, I claim the compound link block, M L K, adapted to allow of adjustment by shimming, substantially as herein set forth.

58,479.—Driving Pump. — Samuel H. Rhoades, Clyde, Ohio.

I claim the point, I, with an enlargement or projection, e', corresponding in size to the sides of the tubular sections and collars, in combination with the said sections and collar valves, E D, and rod, G, arranged and operating in the manner and for the purpose set forth.

58,480.—Whip Rack.—Edward Richmond, Brooklyn, N. Y.

First, I claim in a rack or frame for holding whips, composed of plates of wood or other suitable material, with an interposed sheet of rubber or other elastic substance, as specified, the V-shaped openings or slots formed in the edge of said rack for holding the whip by its tip, the same being constructed and arranged substantially as herein described.

Second, As a new article of manufacture, I claim a rack or frame composed of the materials herein described, in which the circular holes, a and c, are combined with the V-shaped openings, formed in the edge of said rack, the whole being constructed and arranged for operation substantially as shown and set forth.

58,481.—Lamp.—Karl Riedel, Guttenberg, N. J.

I claim the reservoir, A, having hollow handles, H, with suitable absorbent material, D, and non-absorbent material, E, in combination with the gauze cylinder, F, constructed, arranged, and operating substantially as described for the purpose specified.

58,482.—Bookbinder's Paper Cutter.—Michael Richl, Philadelphia, Pa.

I claim, First, The wheel, L, provided with pintles, in combination with the pendent lever, N, and elbow lever, O, and counterbalance, k, substantially as and for the purposes described.

Second, I claim the cams, a2 and a3, in combination with the wheels, o2 and o3, and table, C, for the purposes and substantially as described.

Third, I also claim a paper-cutting mac ine by which the paper is pressed by the action of the table raising against the cutter, and so constructed that when the cutter has passed through the paper that the table and cutter instantly recede from each other, for the purposes and substantially as herein described.

58,483.—Machine for Making Spikes.—A. J. Rogers and W. D. Rinehart, Pittsburgh, Pa.

First, We claim forming the head of the spike by rolling it from point to head between a flange roll and reciprocating die, constructed and operating substantially as hereinbefore described, for the purpose of enlarging the head without bending or upsetting.

Second, The use, in combination with the die, f, forming the bottom and one side of the cavity for forming the spikes, of the poppets or side dies, m, constructed and operating substantially as hereinbefore described.

Third, The use, in combination with the poppets or side dies, m, of the drum, F, and table, H, for elevating, and the roller, q, for depressing the poppets, constructed and operating substantially as hereinbefore described.

Fourth, The use of the wedges, k, in combination with the frame, H, and die, f, for the purpose of adjusting the die, f, to the flanged roll, B, substantially as hereinbefore described.

Fifth, The use of the rollers, l l, in the housing frame pressing against one side of the die table, E, and the rollers, s s, in the adjustable frame, I, pressing against the poppets or side dies on the other side of the table, E, in combination with the die table, E, die, f, and poppets, m, for the purpose of keeping the table in proper position, and preventing the spreading of the poppets, substantially as described.

58,484.—Roofing Material.—John Rouse, Port Gibson, N. Y.

First, I claim the within described process of producing a tile by molding it from sand and lime mortar in molds lined with paper or cloth, and afterward saturating it with coal tar, asphaltum, or petroleum, substantially as and for the purpose described.

Second, A tile made of sand and lime mortar, with beveled edges, and saturated with coal tar, asphaltum, or petroleum, as a new article of manufacture.

58,485.—Machine for Forging Horse-shoe Nails.—Joseph Roy, Boston, Mass.

I claim the combination as well as the stationary arrangement of the stationary anvil, C, the movable anvil, D, the two hammers, F G, and the mechanism for supporting and revolving the nail rod and moving it lengthwise, as set forth, such movable anvil and hammers being provided with mechanism for operating them, substantially in the manner as specified.

I also claim the combination as well as the arrangement of the cutter, E, with the anvil, C, the movable anvil, D, the two hammers, F G, and the mechanism for supporting and revolving the nail rod and moving it lengthwise, as set forth, such movable anvil, hammers, and cutter being provided with mechanism for operating them, substantially as hereinbefore specified.

I also claim the mechanism or combination for supporting and revolving the nail rod and moving it lengthwise, as set forth, the same consisting mainly of the shaft, S, the box, T, the rail, U, the lantern wheel, V, the cam, X, the projection, y, the spring, z, the head, a2, the slotted post, w', the rack bar, H, with its toothed racks, the pawls, b' c', the slider, u, the spring, y, the cam, o, the shaft, h, the crank, u', the rod, t', arm, s', shaft, r', arm, q', pawls, o' p', connecting rod, v', lever, t, and link, m', the whole being substantially as specified.

I also claim the combination of the cams, p', the levers, q q', and springs, r r, or their mechanical equivalents, with the hammers, F G, as arranged and combined with the stationary and movable anvils, C D, and mechanism for supporting and operating the nail rod, substantially as described.

58,486.—Hand Planter.—Nelson Safford, Pleasant Valley, Vt.

First, I claim the elastic bands, b, one or more, fitted in the tube or hole, E, of a seed dropping slide for the purpose of varying the capacity of the same, substantially as and for the purpose set forth.

Second, The scatterers, constructed as shown or in any equivalent way, when applied to a hoe seed planter, substantially as and for the purpose specified.

58,487.—Process of Separating Crude Emery from Foreign Substances.—Nathaniel C. Sawyer, Boston, Mass.

First, I claim the process of cleaning emery and separating it from extraneous softer minerals and other substances by motion and friction in revolving hollow cylinders or receptacles, in connection with the introduction of currents of water or air in to such cylinder or receptacles, to facilitate the separation and escape of such extraneous materials, substantially as set forth.

Second, The process of polishing and rounding emery, by subjecting it when ground or crushed to friction in hollow revolving cylinders or receptacles, without currents of air or water, substantially as set forth.

58,488.—Wood-bending Machine.—J.P. Schmucker, Ashland, Ohio.

First, I claim the table, G, clamps, K, plate, M, and former, P, when constructed and operating as and for the purpose specified.

Second, In combination with the table, G, plate, M, and former, P, I claim the guide blocks, s, constructed as specified.

58,489.—Turn Table for Baker's Oven.—Reuben Shaler, Madison, Conn.

I claim the herein described turn table as a new article of manufacture.

58,490.—Money Drawer.—A. G. and P. M. Shults, Avasca, N. Y.

First, We claim the combination of the loaded lever, E, and locking mechanism, or their equivalents, with the drawer, C, operating substantially as and for the purpose specified.

Second, The spring, D, in combination with the drawer, C, and locking mechanism, or their equivalents, substantially as and for the purposes set forth.

Third, The combination of the lever, E E, rod, G, spring catch, I, bracket, J, cord, L, and spring, D, with the drawer, C, substantially as and for the purpose set forth.

68,491.—Governor for Steam Engines.—Thomas Silver, New York City.

First, I claim the oscillating sleeve fitted to the governor spindle, and so geared therewith that the driving power is transmitted through it to the momentum wheel and its attached vanes, and so connected with the spring and with the regulating valve that the controlling influences of the wheel vanes and spring are transmitted through said sleeve to the valve, substantially as herein described.

Second, Connecting the spring with the oscillating sleeve by means of an eccentric segment or sector, so arranged as to make the action of the spring always uniform or equivalent to that of a weight, substantially as herein specified.

Third, The connection of the speed-limiting vanes with a sleeve or piece which is adjustable longitudinally in relation to the governor spindle, substantially as and for the purpose herein set forth.

58,492.—Signal for Railroad Drawbridges.—Alba F. Smith, Norwich, Conn.

First, I claim in drawbridges mechanically connecting the locking devices, D1 D2, with the danger signal or signals, so that the draw can not be liberated without the danger signal being properly set in advance of the commencement of the movement of the draw from the safe position, and the safety signal cannot be shown until the bridge is locked in the safe position, all substantially as and for the purpose herein set forth.

Second, I claim, in combination with the above, so connecting the night and day signals that both shall be operated at the same time.

Third, I also claim, in combination with the above, the locking of the signals by means, F2 R r1 r2, or their equivalents, so as to necessarily continue to indicate danger during the whole period that the draw is out of the safe position, substantially as and for the purpose herein specified.

58,493.—Cooking Stove.—Samuel Smith, Philadelphia, Pa.

First, I claim the movable plate, B, with its boiler holes and cross pieces, the whole being applied to the top of a cooking stove or range, substantially as and for the purpose herein set forth.

Second, The annular cavity, n, in the plate, D, the said cavity containing any desired number of rollers, in combination with the plate, B, and its annular rib, m.

Third, The perforations, t, in the plate, D, beneath the rollers, q, for the purpose described.

58,494.—Grate Bar.—Sterry Smith, Salem, Mass.

I claim a grate bar composed of a series of paralliel, longitudinal bars, connected together by lugs placed alternately on opposite sides of the next adjoining bar, in combination with the curved bars, H H', alternating with the bars, G G', as shown and described.

58,495.—Horse Shoe.—Edward Sneider, Baltimore, Md.

First, I claim a supplemental shoe, B, provided with the inclined toe pieces, B' B', sliding clamp, E, and screw bolt, F, whereby said supplemental shoe is to be clamped to the fast shoe, substantially as described.

Second, I claim the spring washer, G, applied to the bolt, F, to prevent the same from working loose, substantially as described.

Third, I claim the studs, a a, formed on the rear extremities of the supplemental shoe, B, and employed to prevent the lateral displacement of the same, substantially as described.

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Fourth, I claim the combination with the supplemental shoe, B, of the clamp, E, guides, C C, and protecting plate, B', all constructed and arranged substantially as and for the purpose herein specified.

58,496.—SAFETY VALVE IN WATER BACK FOR RANGES.—T. S. Speakman, Philadelphia, Pa.

I claim the combination, substantially as described, of the valve, B, with the water back, A, for the purpose specified.

58,497.—MANUFACTURE OF FLOOR COVERING.—James H. Spencer, Philadelphia, Pa.

I claim burlap, treated and printed, or otherwise colored, substantially in the manner and for the purposes herein described.

58,498.—ANGULAR SAW GAGE.—Elbridge G. Stanley and James Goodrich, Fitchburg, Mass.

We claim the links, F F, when used for and applied to the purpose specified, to wit: to connect the plates, B and C, constructed substantially as described and set forth, or in any similar manner.

58,499.—ROOFING CEMENT.—George Stead, Brooklyn, N. Y.

I claim a roofing cement, compounded and prepared substantially as herein described, and for the purposes set forth.

58,500.—PLOW.—Clinton Steen, Athens, O.

I claim the novel construction of the plow knee and the mode of attaching the handles, as set forth in the above specification.

58,501.—MODE OF SETTING STONES IN JEWELRY.—Francis Stefane, New York City.

I claim the mortised jewel frame, A, adjustable clamping fingers, c c, and retaining screws, d d, constructed and arranged substantially as and for the purpose herein described.

58,502.—TOP FOR FRUIT CANS.—A. Stewart, Cincinnati, Ohio.

I claim a rim, or trough, A, for a metal fruit can, constructed and applied in the manner herein shown and described.

58,503.—STEAM ENGINE GLOBE VALVE.—C. Stierle and John C. Baer, Cincinnati, Ohio.

I claim the independent valve seat, E, for the valve, H, substantially as described.

I also claim the combination of the valve stem, I, independent screw nut, J, and hub or plug, L, connected together, substantially as and for the purpose specified.

58,504.—TOOL REST FOR GRINDSTONE.—W. H. Strahan, Philadelphia, Pa.

First, I claim the combination of the adjustable foundation plate, A, plate, B, the adjustable plate, D, and bar, E.

Second, The combination of the bar, E, its adjustable guard, I, arm, G, movable block, H, and adjustable collar, H', the whole being arranged substantially as set forth for the purpose specified.

Third, The guard, I, constructed for adjustability and retention on and removal from the bar, E, substantially as described.

Fourth, The clamping pieces, K, constructed and adapted to the plate, B, with serrated edge, and to the foundation plate, A, substantially as and for the purpose herein set forth.

58,505.—SKIRT SUPPORTER.—John Taggart, Philadelphia, Pa.

I claim yoke, y, double stays, c1' c1, c2 c2', c3 c3', single stay, c" c"', belt with buttons, M, endless strings, S P, when combined and constructed together for the purpose and in the manner above described.

58,506.—STEAM GENERATOR.—A. H. Tait and Jos. W. Avis, New York City.

First, We claim the T rings, C, in combination with the cylinders, A B, made in sections and connected to said rings substantially as and for the purpose described.

Second, The longitudinal stay bolts, D, in combination with the rings, C, and cylinder, A B, constructed and operating substantially as and for the purpose set forth.

58,507.—MACHINE FOR CUTTING WOOD.—John A. Taplin, Carthage Landing, N. Y.

In a rotary wood-cutting machine, the circular head, constructed as herein described, for fastening the cutters and the crank shaft, each constructed and arranged substantially as and for the purposes herein described.

58,508.—LAP SKIVER.—John S. P. Taylor, Oxford, Ohio.

First, The combination with the knife, C, or its equivalent, of an eccentric swinging or vibrating gage, constructed substantially as and for the purpose set forth.

Second, The combination with the knife, C, and gage, D, of the springs, B, and screws, F, or equivalent device, for adjusting the said gage in relation to the said knife, substantially as described.

Third, The combination with the gage, D, and knife, C, of the spring plate, K, constructed and arranged substantially as herein set forth.

58,509.—TWEER.—John Theat, Detroit, Mich.

I claim the combination of the convex or conical cover, A, provided with a flange projection, A', overlapping the walls of the mouth of the tweer with the stationary disk, B, and chamber, L, when constructed and arranged substantially as and for the purpose set forth.

58,510.—BABY JUMPER.—J. Patton Thompson, Philadelphia, Pa.

First, I claim the hangers, a a, rod, A, traversing pulley, C, strap, D and E, and the elastic cord, G, when combined and arranged substantially as herein specified and described.

Second, The hook, I, and ring, b, straps, D and E, elastic cord, G, and the chair, H, when combined as specified and described.

58,511.—METHOD OF PRESERVING AND CURING MEAT.—John Tilton, New York City.

I claim curing meats by first cutting them from the bone when expelling the water by pressure, then mixing the curing composition and smoking loose on shelves, or in the canvas bags, substantially as set forth.

58,512.—DOUBLE STILL FOR PETROLEUM.—Peter H. Vander Weyde, Philadelphia, Pa. Antedated Sept. 21, 1866.

I claim a double still, in which all the defects and objection against other double stills are corrected, in the manner described

58,513.—HAT-FINISHING PRESS.—Wm. Walsh, Wm. Walsh, Jr., and M. J. Walsh, Brooklyn, N. Y.

First, We claim the press table, F, with dies, H, and leaves, K, hung on adjustable hinges so that the hinges can be raised and lowered to suit dies of different hights, substantially as described.

Second, We also claim the combination of the table, F, having sectional dies, H, with a platen, E, the dies and platen being operated from the same shaft, substantially as described.

Third, We also claim the hinged dies, H, constructed in two unequal sections for finishing and pressing hats, substantially as and for the purpose specified.

Fourth, The overlapped hinges, I, in combination with the leaves, K, and tables, F, which contain the dies, H, substantially as described for the purpose specified.

Fifth, We also claim the sectional dies, H, in combination with the platen, E, substantially as described.

Sixth, We also claim the sectional hat blocks, P, divided obliquely from near the center of the tip to opposite side, substantially as described for the purpose specified.

58,514.—CIDER MILL AND FRUIT PRESS.—L. A. Warner, Freeport, Ill.

First, I claim the press, K, piston, L, strainer, c, slides, p and e', cone driver, M, rods, i and f', curved lever, f and o, and jointed lever, L', arranged in the manner substantially as shown and described and for the purpose set forth.

Second, The arrangement of the attachment of the jointed lever, L', to the rear end of the press by the spring, n, and adjustable stays, n', and connecting rod, s, for the purpose and in the manner set forth

Third, The wheel, H, friction roller, J, as arranged in combination with the levers, f o and S, for the purpose and operating in the manner described.

58,515.—WASHING MACHINE.—J. L. Weaver, Davis, Ill.

I claim the combination of the frame, G H I, with the side and end boards of the washing machine and with the roller frame, J K L, substantially as described and for the purpose set forth.

Second, The combination of the roller frame, J K L, with the side boards, B and C, and with the pressure rollers, M and N, substantially as described and for the purpose set forth.

Third, The levers, U, constructed as described, in combination with the links or bars, T, the cross piece, K, of the roller frame, and the elastic ropes or bands, V, substantially as described and for the purposes set forth.

Fourth, The arrangement of the endless apron, B' C', rollers, M N H, and box of the machine, operating in the manner and for the purpose herein specified.

Fifth, The arrangement of the rods, F', levers, G' H', with the top frame G H I, substantially as described and for the purpose set forth.

58,516.—ENGRAVING COPPER, ETC.—Victoria Quarre Wedikind, Philadelphia, Pa.

I claim the production by chemical process of engraved plates forming designs in relief by the following process:

Covering the copper plates with German white, tracing of designs therein, covering the white layer with engraver's varnish and treating it with nitric acid, substantially as above described.

58,517.—MACHINE FOR GATHERING CLOVER SEED.—Daniel K. Wertman and William H. Rirnbold, Centralia, Pa.

First, We claim the peculiar setting of teeth, a a a, on axle, m, in the manner and for the purpose above set forth.

Second, The combination of levers, P, with uppers, u, reel, R', axle, m, when constructed and operated in the manner and for the purpose above set forth and described.

Third, The independent connection of teeth and upper and lever from body or box of machine, allowing the teeth to be worked irrespective of the box, as aforesaid set forth and described and for the purpose mentioned.

58,518.—COFFEE POTS.—William Westlake, Chicago, Ill.

First, I claim, in combination with the cylindrical portion of a coffee pot, the scraper and strainer, constructed and operated as herein set forth.

Second, I claim the combination of the bar, d, having the recesses, e, with the wires, f, and projection, g, for guiding and locking the scraper and strainer, as set forth.

58,519.—BENCH HOOK.—Charles H. Weston, Lowell, Mass.

I claim a bench hook, when its several parts are constructed and arranged to operate substantially as described.

58,520.—MACHINERY FOR MAKING HORSE-SHOE NAILS.—Amos Whittemore, Cambridgeport, Mass.

First, I claim the oscillating dies, operating in conjunction with hammers which move back and forth in a right line, which are arranged in inclined positions, and operate substantially as described.

Second, The combination of two hammers, B B', with the oscillating die head or beam A3, and connecting rods, b3 b3, arranged to operate substantially as described.

Third, The combination of the die beam, A3, inclined hammers, B B', eccentric, a, and yoked pitman rods, a', the latter being guided by the driving shaft, A2, substantially as described.

Fourth, The application of spring or yielding guides, b2, to the reciprocating hammers, substantially as described.

Fifth, The rocking feed nippers, D, constructed and operated so as to gripe the nail rod and then deliver this rod between the nippers, E, in a position to be acted upon by the hammers and dies, substantially as described.

Sixth, The application of a support and guide, f2, to the nippers, D, for guiding the end of the nail rod up to the gage, E, substantially as described.

Seventh, The adjustable gage, F, in combination with the rocking feed nippers, D, substantially as described.

Eighth, The pair of shears, d5 d6, constructed and operated substantially as described, and arranged in front of the point where the nails are forged, and in such position as to allow of the feeding of the nail rod to a proper position by the nippers, D, substantially as described.

Ninth, Communicating motion to the shears, and also to the feeding nippers, from the driving shaft, A2, through a cam shaft, C', by means substantially as described.

Tenth, The employment of the reciprocating retracting nippers, E, so arranged and operated as to take the nail rod from the feeding nippers, hold it until the nail is finished, and then retract the nail from the hammers and dies, substantially as described.

Eleventh, The combination of the hooked rod or lever, j, with the nippers, E, substantially as and for the purpose stated.

Twelfth, Effecting the opening and closing of the nipper jaws, g g', and hook, k, substantially as described.

Thirteenth, Connecting the nippers, E, to a rectilinear reciprocating rod, g3, which passes transversely through the frame plate A A1, and is opened by means of a cam on the cam shaft, C', and a spring, substantially as described.

Fourteenth, The adjusting screws, g4, or its equivalent, applied to the rod, g3, for regulating the length of its strokes, substantially as described.

Fifteenth, The combination of the hook or stop, d7, on the lower shear blade, d5, with the retracting nippers, E, substantially as and for the purposes described.

Sixteenth, The combination of rocking feed nippers, D, the retracting nippers, E, and the shears, with the devices for forging horse-shoe nails, said parts being arranged substantially as described.

58,521.—MACHINERY FOR MAKING SPLIT SPIKES.—Amos Whittemore (assignor to the Cambridge Horse Nail Company), Cambridgeport, Mass.

First, I claim so constructing the splitting devices, that in the act of splitting the metal both split portions shall be supported laterally, and be separated in the plane of the cut, substantially as described.

Second, The combination of a device for severing the spike blanks from the rods, with a device which will split the spikes in a direction with their length, constructed and arranged substantially as described.

Third, The combination of the movable blocks, E E', with the splitting and cutting-off mechanism, and with the furnishing mechanism, substantially in the manner and for the purpose described.

Fourth, The beveling cutters, G' H, or their equivalents, which will bevel the ends of a split spike blank, before its split ends are closed, substantially as described.

Fifth, The combination of splitting and beveling cutters, in a machine for producing split spikes, constructed and arranged substantially as described.

Sixth, The combination of the heading tool, J, with machinery constructed and arranged substantially as herein described for splitting and forming the spike ready for its action, as set forth.

Seventh, The employment of the compressing head, L', to close the forked ends of the split rods or spikes, substantially as described.

Eighth, Making split spikes of the construction herein described, by means substantially as described, and which operate on the principle set forth.

58,522.—OVEN.—Abel Whitlock, Danbury, Ct.

I claim the jacket or reverberator, E, in combination with the baking chamber of an oven, substantially in the manner and for the purpose set forth.

58,523.—CASTER FOR FURNITURE.—John A. Wiedersheim, Philadelphia, Pa.

I claim the combination and arrangement of the armed revolving socket, A, and flanged cap, D, provided respectively with depressions, d, and projections, c, and operating substantially as described and for the purpose specified.

58,524.—LAMP BURNER.—Samuel W. Wilcox, Mendon, Mass.

I claim the arrangement and application of the two separate gates or extinguishers, with respect to the flat wick tube and a lever or its equivalent applied to such tube, and the body of the burner.

I also claim the arrangement as well as the combination of the two gates or extinguishers with the wick tube and its auxiliary deflector, the whole being substantially as described.

58,525.—BREECH-LOADING FIRE-ARM.—David Williamson, New York City.

First, I claim the detached spring stop, a, used with the lever, G, and the underside of the barrel, B, being so constructed and arranged as to act as a stop for the barrel and a direct retractor, substantially as specified.

Second, The pin, x, upon trigger, E, when used with stop, a, for the purpose of locking the barrel and preventing it from being thrown up to or away from the breech except at half cock, substantially as set forth.

58,526.—BAILING PRESS.—John S. Williams, Meridian, Miss.

I claim the combination of the capstand, M, the horizontal draft lever, I, the roller, f, on the track L L, the driving or compressing lever, H, the follower, G, and the tumbling box, F, constructed, arranged and operated substantially as and for the purpose herein described.

58,527.—CLASP FOR HOOP SKIRT.—Samuel R. Wilmot, Bridgeport, Conn.

I claim, First, A hoop-skirt clasp, the longitudinal edges of which are straight near the ends and for the rest of their length so formed into tongues and recesses that when folded upon the hoop, the tongue of one edge shall fit into the recess of the other, and vice versa, substantially as described.

Second, The punctured spurs or projections, e, in said clasp, substantially as and for the purposes set forth.

58,528.—MACHINE FOR PREPARING PEAT FOR FUEL.—Herman Winter, Williamsburgh, N. Y., and Frederick W. Newton, South Orange, N. J.

We claim the combination in a peat machine of the preparing chamber and press in such manner that the material of the former constitutes a part of the frame of the press, substantially as set forth.

We also claim the combination in a peat machine of the following instrumentalities, viz.; the preparing chamber, grinding instruments, and press, all operating in combination, substantially as set forth.

We also claim the combination in a peat machine of the following instrumentalities, viz.; the preparing chamber, internal heater, and press, all operating in combination, substantially as set forth.

We also claim the combination in a peat machine of the following instrumentalities, viz.; the preparing chamber, grinding or kneading instruments, internal heater, and passage thereto, all operating in combination substantially as set forth.

We also claim the combination in a peat machine of the following instrumentalities, viz.; the preparing chamber, press, grinding instruments, and pipe for admitting steam into the preparing chamber, all operating in combination, substantially as set forth.

We also claim the combination in a peat machine of the following instrumentalities, viz.; the preparing chamber, press, internal heater, and pipe for admitting steam into the preparing chamber, all operating in combination, substantially as set forth.

We also claim the combination in a peat machine of the following instrumentalities, viz.; the preparing chamber, press, grinding instruments, internal heater, and pipe for the admission of steam into the preparing chamber, all operating in the combination substantially as set forth.

58,529.—SHEEP RACK.—John D. Woodbury, Wilson, N. Y.

I claim the slots, p p, in combination with the pins, o o, and bolts, r r, for the purpose of adjusting the side boards, C, so as to form a roof, arranged and operating as described.

I also claim the dovetailed notches, s s, in combination with the side boards, C C, when provided with slots, p p, for retaining the said boards in place, substantially in the manner set forth.

58,530.—FILTER AND COOLER COMBINED.—H. T. Woodman, Dubuque, Iowa.

I claim the arrangement of the water chamber, B, filter, C, with top and bottom, perforated plates, c d, pipe, n, receiving and supplementary chamber, D, and pipe, E, with walls, A, constructed and operating in the manner and for the purpose specified.

58,531.—CHERRY STONER.—Charles E. Wright, Auburn, N. Y.

I claim the combination of the corrugated cylinder, B, with the curved perforated bed plate, D, and springs, F, when used as and for the purpose specified.

58,532.—COMPOSITION OF MATTER.—William K. Wyckoff, Ripon, Wis.

First, I claim the use of residuum as above described and for the purposes specified.

Second, I claim also the treating and refining process, substantially as herein described.

Third, I claim the within described composition made of the ingredients set forth, and mixed together, substantially in the manner and for the purposes specified.

58,533.—MODE OF ATTACHING CULTIVATOR TEETH TO THE FRAMES.—George W. Zeigler, Tiffin, Ohio.

I claim, First, Securing a shovel or cultivator tooth to its frame by means of a universal joint, in such manner that the shovel can be inclined either laterally or longitudinally with respect to its frame, substantially as described.

Second, The concavo-convex shank, a, formed on or secured to a shovel or tooth, substantially as and for the purpose described.

Third, The combination of the shank, a, concave plate, D, convex bolt head, g, nut c, and a shovel, C, or its equivalent, substantially as described.

58,534.—PLOW.—Christian Zimmerman, Collinsville, Ohio.

I claim, First, The manner of attaching the tongue to the plow by means of the perforated plates, a a, and pins, b b, arranged and operating in the manner and for the purpose described.

Second, The combination of the protecting plate, c, inclosing the land side of the plow, with the mold board and land side made of one piece of metal, substantially as described for the purpose specified.

Third, The hinged draw bars, d d, with their adjusting nuts and screws, in combination with the adjusting frame composed of screw rods, e e, and cross bar, g, with their nuts, and adjustable handles arranged and operating in the manner and for the purpose set forth.

58,535.—CLOTHES POLE.—W. W. Armington, New Haven county, Conn., assignor to E. A. Kelsey, Meriden, Conn.

I claim making a clothes line supporter, a, in two or more parts, with the clasps, b, catch, c, substantially as and for the purpose described.

58,536.—MATCH SAFE.—James E. Auld (assignor to himself and John M. Layton), Buffalo, N. Y. Antedated September 15, 1866.

I claim the igniter, D, so combined with a pocket match safe that it shall act against the prepared end of the match as it is thrust from the safe and ignite it, and afterward hold it, until extinguished, substantially as set forth.

58,537.—CIGAR LIGHTER.—William Belcher (assignor to himself and F. G. Hickerson), New Haven, Conn.

I claim the cigar lighter herein described, constructed and attached to the cigar, substantially as and for the purpose specified.

58,538.—CIGAR PRESS.—Jeremiah Campbell (assignor to himself and John Campbell), Lancaster, Pa.

I claim the construction and application of the flat links, F, with their hole, e, and slot, f, when employed in the manner and for the purpose specified

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I also claim the followers, I' I", and headed slats, D, when combined, linked, and operated, substantially in the manner and for the purpose specified.

I also claim the open filling in frame, G g, with its notches, h, constructed and operating in the manner and for the purpose set forth.

I also claim the key blocks, W, in combination with a double side pressure and vertical pressure, given in the manner and for the purpose specified.

58,539.—QUARTZ CRUSHER.—I. S. Croll, North San Juan, Cal., assignor to himself and Quartus Rice, Nevada, Cal.

I claim giving the mullers a positive motion on their own axis by means of the gears, D and G G, or their equivalents, while said mullers are driven around in the pan by the rotation of the frame which carries the shafts of the mullers.

58,540.—CLASP FOR SKIRT HOOP.—Thomas B. De Forrest, Birmingham, Conn., assignor to the American Press and Clasp Co., Bridgeport, Conn.

The two clasps, d d, in combination with the indentation, C, so as to secure the two ends of the hoop, substantially in the manner herein set forth.

58,541.—HAY ELEVATOR.—Phineas C. Ellsworth (assignor to himself and M. Salizbiery), Venice, N. Y.

I claim the arrangement of the reel, the lever, J, the cord, E, and the trip handle, K, constructed substantially as specified, for the purpose set forth.

58,542.—SHIFTING RAILS FOR CARRIAGE SEAT.—John Fellows (assignor to himself and Albert Card), Chicago, Ill.

I claim, First, The braces or supports, D, when provided at their upper ends with heads having slots or mortises on the plane of the seat, and gtted to the seat, so as not to project beyond, substantially as and for the purposes specified.

Second, The arrangement and combination of the braces, D, with the spurs or projections, e e and d d, with the rail, c, and carriage seat, substantially as and for the purposes specified.

58,543.—ROTARY SPADING MACHINE.—E. J. Fraser (assignor to himself and Orange Noble), Erie, Pa.

I claim, First, The smooth-faced cylinder, C, set with rows of teeth or spades, m, and hung on the tree shaft, a a, in combination with the shifting clutch, d, and the vertical rack, c, and pinion, b, for raising and lowering the cylinder, constructed and operated substantially as and for the purpose herein described.

Second, I claim the rotating pulverizing arms, p, in combination with the spading cylinder, C, and connected therewith by the gear wheels, h k l, operated, by the epicycloidal wheel, F, on the chine of the cylinder, constructed and operated substantially as and for the purposes herein specified.

Third, I claim the spring scrapers, r, and the friction roller or bearer, E, in combination with the spading cylinder, C, constructed and operated substantially as and for the purposes herein described.

58,544.—HAT-PRESSING MACHINE.—Isaac T. Green, Milford, Conn., assignor to himself and C. H. Berry, Fort Greene Place, Brooklyn, N. Y.

I claim, First, The application of steam to the hat while the same is in place between the presser and the die, as and for the purpose described.

Second, The employment of a wet sheet, in combination with the die and presser, while the operation of pressing a hat progresses, substantially as and for the purpose set forth.

Third, The perforated shield, C, in combination with the presser and die, substantially as and for the purpose described.

Fourth, The perforated shield, C, and wet sheet, D, in combination with the presser and die, as set forth.

Fifth, Making the perforated shield tapering, or thicker at the bottom, as and for the purpose described.

58,545.—BED BOTTOM.—Robert L. Hall, Lowell, Mass., one-half, undivided, assigned to Jos. G. Russell, Boston, Mass.

I claim the combination of the rubber springs, i, metallic washers, g, and circular holes, e, as herein described, and for the purpose set forth.

58,546.—BOILER GAGE COCK.—William T. Howard, Baltimore, Md., assignor to himself and Isaac McKim Chase.

I claim, First, The adjustable siphon or tubes, E E', employed in combination with the chamber, A, and try cock or valve, G, to indicate the water level in the boiler, substantially in the manner specified.

Second, I further claim the combination of the scale, J, with the adjustable gage tubes, substantially as set forth.

58,547.—HORSE-POWER BRAKE.—John Hull and Wm. P. Anderson (assignors to themselves and Henry J. Hull), Hackettstown, N. J.

We claim, First, The hooked lever shaft, d, and flanged roller, G, thereon, operating relatively to the belting, D, for the release of the brake, E, in its connection with the lever, by the rod, g, substantially in the manner and for the purpose set forth.

Second, The brake, E, and weight, H, combined, operating automatically by the dropping of the flanged roller, when the belting slips off from the wheels, substantially in the manner and for the purpose as herein set forth.

Third, The construction of the box, a, block, c, hooked lever shaft, d, and flanged roller, G, as arranged and applied to the standard, F, of the side of the platform, substantially in the manner and for the purpose specified.

58,548.—LOCK FOR TRUNKS.—J. G. Kast (assignor to L. L. Arnold), New York City.

I claim, First, The sliding spring bolt, B, provided with two or more hooks, c d, and with a suitable fastening for the key, C, at its end, in combination with the staples, e f, and with said key, constructed and operating substantially as and for the purpose set forth.

Second, The spring, h, and notched collar, i, in combination with the sliding bolt, B, key, C, and bit, j, constructed and operating substantially as and for the purpose described.

Third, The spring stop, k, in combination with the staple, e, and spring bolt, B, constructed and operating substantially as and for the purpose set forth.

58,549.—COAL-DUMPING APPARATUS.—Edwin R. Kerr (assignor to himself and J. L. Platt), Kewannee, Ill.

I claim the chutes, B, placed in a shed or building and provided with two doors, C E, the outer ones, E, being so arranged as to serve, when lowered or opened, as a continuation of the chutes, substantially as shown and described.

I also claim counterpoising the outer doors, E, by means of weights, substantially in the manner as and for the purpose specified.

I further claim the hanging of the inner doors, C, at their upper ends in combination with the spring bolts, D, at their lower ends, when said doors are applied to chutes, B, for the purpose herein set forth.

58,550.—"CAST OFF" OF WAXED-THREAD SEWING MACHINES.—Charles E. Langmaid, Woburn, Mass., assignor to himself and Geo. A. Langmaid, Stoneham, Mass.

I claim a hinged cast-off foot for sewing machines which adjusts itself to the side of the hook and wears evenly to prevent cutting the thread, constructed substantially as herein described.

58,551.—GRAIN SCREEN.—Josiah Lang (assignor to Jacob G. Wolf), Morristown, Ind.

I claim the cam wheel, T, in combination with the friction rollers, S, and box, D, the whole constructed and operating substantially as herein described.

58,552.—FURNACE AND BOILER.—Henry McClure (assignor to himself and James Ellis), Terre Haute, Ind.

I claim an improved furnace and boilers formed by combining the slides, O, rock shaft, P, rock arms, R, links or bars, S, and boilers, F G I J K L, with each other and with the furnace flue curved beneath the boilers, when said parts are constructed and arranged substantially as herein described and for the purposes set forth.

58,553.—MANUFACTURE OF ILLUMINATING GAS.—Adolph Millochan (assignor to the American Retort Company), New York City.

First, I claim a separate casing for containing the coal, or other material, to be distilled, in combination with the main retort within which said casing is introduced, as and for the purposes specified.

Second, I claim the method herein specified of subjecting the products of distillation to a heating operation within the retort in which they are generated, as and for the purpose set forth.

58,554.—METHOD OF OPENING TIN CANS.—J. Osterhoudt (assignor to himself and Wm. B. Dubois), New York City.

First, I claim a device for closing a can, or other vessel, consisting of a cover or cap, a, to be separated from the said vessel, by rolling it upon any suitable instrument by the aid of a tag or lip, c, formed in one piece with the cover or cap and left loose in soldering the latter to the can, as herein explained.

Second, In combination with a cover constructed as aforesaid, I claim a recess in the top plate, B, of the can, for the reception of the tag, c, as explained.

58,555.—MACHINE FOR PRESSING BONNETS.—George M. Richardson, Barre, Mass., assignor to himself and N. L. Johnson, Dana, Mass.

I claim, First, Employing the screw, C, in combination with the dies, A A, and the bonnet block, E, constructing and operated substantially as and for the purposes herein described.

Second, I claim also the metal strip, f, within the dies, A A, for covering the division between them, as herein described.

Third, I claim also the spring, e, in combination with the block, E, as herein described.

58,556.—WOOL-OILING MACHINERY FOR CARDING ENGINES, ETC.—Wm. H. Salisbury, Providence, R. I., assignor to himself and Jesse A. Locke, Boston, Mass.

I clam the steam pipe, k, in combination with the oil reservoir, K, substantially in the manner and for the purpose set forth.

I also claim, in combination with the oil reservoir, K, the tube, f, with its regulating cocks, g h, and strainer, i, for the purpose specified.

58,557.—CORN PLANTER.—T. T. Shawcross (assignor to himself and L. D. Wyatt and E. D. McManama), Allisonville, Ind.

I claim, First, The box, 1, the wheel, 19, with its cavity, 21, and the agitator, 20.

Second, The spring, 12, levers, 13 14 15 16 18 and 17, all arranged and operating substantially as described for that purpose.

58,558.—COMBINED ERASER AND PENCIL SHARPENER.—Charles D. Smith, Washington, D. C., assignor to himself and John A. Wiederscheim, Philadelphia, Pa.

I claim the combination with an eraser of a pencil sharpener, having substantially the characteristics herein specified.

58,559.—APPARATUS FOR CARBURETING AIR.—Levi Stevens, Fitchburg, Mass., assignor to himself and Norman C. Munson, Shirley, Mass.

I claim, First, The cups or disseminators, B B, constructed and operating substantially as described.

Second, The combination of one or more cups or disseminators, B B, with the cylinder, A, for the purposes described.

Third, The arrangement of two or more cups or disseminators with each other, substantially as described.

58,560.—POTATO DIGGER.—Andrew Walker, Claremont, N. H., asssignor to J. P. Upton, same place, and C. Eastman, Conway, Carroll county.

I claim the combination of the cutter, e, plows, f, and cylinder of prongs, g, with the grate or screen, k, and mechanism for actuating said cylinder, substantially as specified.

58,561.—NECKTIE, COLLAR AND BOSOM COMBINED.—G. V. Woods (assignor to Austin White), Belchertown, Mass.

First, I claim making or forming a collar, bosom and necktie from a single piece of paper, cloth or other suitable material, substantially as set forth.

Second, Making the part or necktie, C, substantially as set forth.

Third, Making the part or bosom, A, and part or necktie, C, together or from a single piece of material, substantially as set forth.

Fourth, Making the collar or part, B, and necktie, C, together or from a single piece of material, substantially as set forth.

Fifth, The combination with the end, c, of the collar, B, substantially as shown in the drawings.

Sixth, I claim the piece, D, in combination with the bosom and collar or either, for the purposes set forth.

58,562.—SIGNAL CODE FOR ELECTRIC TELEGRAPH.—F. J. Bolton, London, England.

I claim the herein described code of signals for communicating intelligence or transmitting messages by the electric or magnetic telegraph, and the method of arranging and compiling the same, substantially as set forth.

58,563.—STOP CUTTERS FOR CUTTING CONTINUOUS SHEETS OF PAPER INTO SHORTER ONES.—Geo. Keeble, Suffolk, England.

I claim the combination of the lever, h, connecting strap, i, rod, E, key, o, collar, G, tube, B, stand, A, cap, c, and the spring, D, or its equivalent, the whole arranged substantially as and for the purpose set forth.

58,564.—STEAM GENERATOR.—Robert W. Thomson, Edinburgh, Great Britain.

I claim the constructing of vertical boilers, with fire gas in tubes arranged in a circle or circles, and combined with a vessel which projects down into the furnace from within such circle of tubes, and which is enlarged below its attachment to the tube plate, substantially as hereinbefore described.

58,565.—CONSTRUCTION OF RAILWAYS.—Swain Winkley, New York City, assignor to himself and Asa Bigelow, Jr.

I claim the construction of the corrugated base plates, a, combined with the cap pieces, b, and tie rods, c, when applied to railways, substantially in the manner herein described.

REISSUES.

2,367.—PICKER-STAFF MOTION FOR LOOMS.—Edmund H. Graham, Manchester, N. H. Patented Oct. 16, 1860.

I claim steadying the rocker of the picker staff on its bed by journals at a right angle to the picker shaft, which journals form its center of motion, substantially as described.

I also claim the journal boxes with open ears in combination with the journals that steady the rocker on the bed.

2,368.—STRAW CUTTER.—Franklin Benjamin Hunt Richmond, Ind. Patented Jan. 5, 1864.

First, I claim, as my improvement in straw cutters, so attaching the balance wheel to its shaft by a yielding or frictional device that when the knife meets with an obstruction the wheel may continue to revolve for a limited period independent of the knife until stopped by the frictional device, for the purpose of preventing injury to the knife, substantially as herein described.

Second, I claim the bar, c', connected to the shaft, n, and carrying the pinions, b' and d', in combination with the pinions, a' and e', and link, f', connected to the shaft, p, in substantially the manner specified, whereby the rollers, H and G, on the shafts, n and p, are allowed to move apart and the wheels remain in gear, as set forth.

Third, I claim the guide board or plate, u, connected to and moving with the frame, t, of the upper feed roller, H, and extending down the back of the said roller to near a level with its axis, substantially as and for the purpose set forth.

Fourth, I claim the bearing bar, x, formed in one piece with the lower halves, b, of the journal boxes of the cutter shaft, C, and extending across from one to the other, in combination with the standing cutter, E, attached to said bar, x, substantially as and for the purposes specified.

Fifth, I claim mounting the upper feed roller, H, in a frame formed with slings extending below the lower roller and acted upon by a spring, or its equivalent, in combination with a slotted frame to guide the roller as it moves up or down, substantially as set forth.

Sixth, I claim the hooked slings, q, in combination with the yielding feed roller, H, and spring, I, or its equivalent, substantially as set forth, whereby the said feed roller, H, is limited in its lateral movement, as set forth.

Seventh, I claim the curved slot, v, in the frame, w, in combination with the feed roller, H, slings, q, and a hub, u', surrounding the axis, p, of the roller, H, and relieving the same from friction against the frame, w, as set forth.

Eighth, In combination with the bar, x, and standing cutter, E, made as set forth, I claim the single revolving and diagonal knife, D, with its axis placed above the standing cutter, E, to act with a slanting and shearing cut, substantially as set forth.

2,369.—BLOWER.—P. H. Roots, Connersville, Ind. Patented Sept. 25, 1860.

I claim the coacting rotary abutments, A B, each consisting of two or more pistons, D D, and two or more recesses, E E, which are arcs of true circles and formed with equal radii, substantially as set forth.

2,370.—WASHING MACHINE.—Benjamin Wright, Hudson, Mich. Patented March 28, 1865.

First, I claim the rocker, N, and arms, G, constructed and used with the box, A, substantially as and for the purpose herein specified.

Second, The arrangement of the box, A, with the rubber, C raised above its bottom when used with the rocker, N, and arms, G, as and for the purpose specified.

2,371.—PREVENTION OF INCRUSTATION IN STEAM BOILERS.—N. B. Webster, Portsmouth, Va., and Robert W. Young, Richmond, Va. Patented Oct. 23, 1860.

We claim the connecting with the interior of a steam boiler, a metal electro-negative to the boiler, for the purpose of preventing incrustation in the steam boiler.

DESIGNS.

2,472.—BRACKET.—John H. Bellamy (assignor to himself and D. A. Titcomb), Charlestown, Mass.

2,473.—SEWING MACHINE.—Joseph Bond, Jr., Newark, N. J., assignor to the Lathrop Sewing Machine Company of the State of New York.

2,474.—FRAME OF A SEWING MACHINE.—Joseph Bond, Jr., Newark, N. J., assignor to the Lathrop Sewing Machine Company of the State of New York.

2,475.—SPOON HANDLE.—Augustus Conradt, Philadelphia, Pa.

2,476.—DENTISTS' GRINDING LATHE.—Henry Coy, Philadelphia, Pa.

2,477.—CIGAR AND TOBACCO SAFE.—John H. Knight and Joseph P. Farrand, Detroit, Mich.

2,478.—REEL.—Catholina Lambert, New York City.

2,479.—LAMP FLUE.—Thos. Moore and J. S. Haldeman, Bloomington, Ill.

2,480.—PLATE OF A COOK'S RANGE.—Rees Moss, Philadelphia, Pa.

2,481.—COFFIN HANDLE.—C. L. Neiberg (assignor to Sargent & Co.), New Haven, Conn.

2,482 and 2,483.—CHILD'S LONG COMB.—Leonce Picot, Hoboken, N. J., assignor to the Rubber Clothing Company of New York. Two Patents.

2,484.—WHEEL.—Amos Rank, Salem, Ohio.

2,485.—COOK'S STOVE.—Jacob Steffe (assignor to Thomas Foster), Philadelphia, Pa.

2,486.—BURIAL CASE.—J. A. Wilson, Springfield, Mass.

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Philadelphia, Aug. 15, 1866.

Joseph Harrison, Jr., Esq.:

Dear Sir:—We have your favor of the 9th inst., and may say in reply, that we have now had the "Harrison Boiler" in constant use in our Works for nearly two years. It has given us great satisfaction. We consider it quite as economical in the use of fuel as any boiler we have used, or with which we are acquainted, and are satisfied that it is much safer than any boiler made.

Jours truly,
WM. SELLERS & CO.

Philadelphia Rolling Mill,
Kensington, Philadelphia, Aug. 13, 1866.

Mr. Joseph Harrison, Jr.:

Dear Sir:—I will say in reply to yours of the 9th inst., that I have had one of your Boilers almost in constant use over one of my Puddling Furnaces for over eighteen months, and in all that time it required no repairs, with the exception of changing a few light bolts for heavier ones, and it is now running without any signs of leaking or want of repair, apparently as good as when first put up. I think I have just grounds, from the experience I have had, to recommend them as a good and safe boiler, and one that generates steam very fast. I feel confident that I get nearly double the quantity of steam from this boiler that I do from any other Puddling Furnace in my Mill that has two Cylinder Boilers over them. I believe the day is not far distant when they will be in general use in Iron Manufacturing establishments.

Yours respectfully,
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Dear Sir:—We take great pleasure in testifying to the merits of your Boiler, as a generator of steam, the confidence we have in its safety, its economy of fuel, and also of space for its erection. It has now been in successful operation more than a year, without the necessity of any repairs, and our confidence increases with its use. We shall always consider it a privilege to exhibit and explain its merits to any who may wish to examine it.

Respectfully, etc.,
GEO. W. SIMONS, BRO. & CO.

Philadelphia, Aug. 9, 1866.

Mr. Joseph Harrison, Jr.:

Dear Sir:—In reply to your communication respecting our opinion of the "Harrison Boiler," we would state as follows: We have had one of your Boilers in constant use for twenty-two (22) months, during which time it has supplied steam to a 6-horse Engine, driving about seven lathes and several other power tools. It is perfectly tight and free from leakage; takes up less room than an ordinary Boiler; and as to its economy in fuel, you can best judge for yourself, from the following statement: During the past year it has burned from 50 to 60 tons Pea Coal, each week averaging 6½ to 7 days. We can truly recommend said Boiler, from our own experience, as safe, reliable, and economical.

Truly yours,
TAWS & HARTMAN, 1237 North Front street.

Office of the Salem Coal Company,
Philadelphia, August 16th, 1866.

Joseph Harrison, Jr., Esq.:

Dear Sir:—After having your cast-iron Boiler in use at the Colliery of this Company for more than a year, it gives me pleasure to state that its operation has been very satisfactory. In the important point of economy of fuel it is reported to be superior to any other Boiler we have in use, and as regards its safety from destructive explosion, it certainly has no equal among all the various forms of boilers that have come under my notice.

Very truly,
JNO. C. CRESSON, Pres't.

Germantown, Aug. 16, 1866.

Mr. Joseph Harrison, Jr.:

Dear Sir:—About four months ago, we put in one of your "Harrison Boilers," and it gives us much pleasure to be able to state that, as a safe steam generator, in its general economy in fuel, time, etc., we consider it the best Boiler now in use. Our Boiler is 50 horse-power; our Engine has a 10-inch cylinder, with a 36-inch stroke: the cost of running this, and almost always at its utmost capacity, is about two dollars per day. In fact, we consider your Boiler so excellent in its services, aside from its safeness from explosion and its real economy, that we could not and would not do without it. It will afford us much pleasure to show the "Harrison Boiler" to any one who may call at our Works, where they can daily see it in practical operation.

Very truly yours, etc.,
SELSOR, CROOK & CO.,
Manufacturer of Edge Tools, Hammers, etc., Armat-st.,
Germantown, Philadelphia.

New York, August 15th, 1866.

Mr. Joseph Harrison, Jr., Philadelphia, Pa.:

Dear Sir:—We take pleasure in informing you that the Boiler purchased from you, which we have had in use about five months, has given the best satisfaction, and has borne out everything you claimed for it. As a steam generator we have never seen anything equal to it. We consider the saving of fuel as being very great compared to ordinary boilers. If we had need of more steam capacity, we should most certainly use your Boiler in preference to any other. You are at liberty to use this, if it will be of any service to you. Yours truly,
UNITED STATES WATCH CO., F. A. GILES, Pres't.

Pennsylvania Hospital for the Insane,
Philadelphia, August 11, 1866.

My Dear Sir:—In my annual Report of this Institution, for 1865, I stated my high estimate of your Boiler, for safety, economy, and general efficiency. Additional experience has tended to confirm all that I then said, and if we required additional Boilers, for any purpose, I should certainly recommend yours.

Very truly yours,
THOMAS S. KIRKBRIDE.

Jos. Harrison, Jr., Esq., Philadelphia.

Philadelphia, Aug. 10, 1866.

Joseph Harrison, Jr., Esq.:

Dear Sir:—The "Harrison Boiler" we bought of you, some four months ago, has given us perfect satisfaction. The Boiler is placed over one of our heating furnaces, and, in consequence of the steam-pipe connections with our main steam pipe, we have no means of testing its economy in fuel. We believe it to be safer and more economical than the Cylinder Boiler, and have no hesitation in recommending it as admirably adapted for Rolling Mills. Its length, the same as the length of a heating furnace, enabled us to place it immediately over the furnace, requiring no additional space, thus avoiding the necessity of locating the furnaces at an inconvenient distance from the machinery, which the ordinary Cylinder Boiler requires.

Very truly yours,
VERRAE & MITCHELL.

Philadelphia, Aug. 15th, 1866.

Joseph Harrison, Jr., Esq.:

Dear Sir:—Before ordering one of your Boilers, we sought information respecting them from several of our friends who were using them. Their testimony was of such a character that we felt no hesitation in adopting it, and it has more than answered our expectations. We recommend them as safe, very economical, and easily managed; they possess fully all the advantages you claim for them.

Very respectfully yours,
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Atlantic Mills, Ellwood, Atlantic county, N. J.,
August 13th, 1866.

Mr. Joseph Harrison, Jr.:

Dear Sir:—We have had one of your Six-slab Boilers in use in our Paper Mill for five months. We consider it unequaled by any other make of boiler now in use. With less than one-half the fuel it produces more and drier steam than any boiler we ever used. It is simple, easily managed, and perfectly safe. Our Boiler bleaches the stock for, and dries one tun of paper daily, with one cord of pine wood per day.

Very truly,
McNEIL, IRVING & RICH.

Mercantile Printing Rooms, Franklin Building,
Philadelphia, 8th Aug., 1866.

Joseph Harrison, Jr., Esq.:

Dear Sir:—I am very much pleased with the Boiler you put in for me some nine or ten months ago. It has been in constant use—no trouble—no repairs—no stopping to clean out, and steam can be "got up" in about twenty minutes. It requires less coal than the Cylinder Boiler formerly used here, although it is doing a great deal more work. I cheerfully recommend it as being and doing all that you claim for it.

Yours very respectfully,
JAMES B. RODGERS.

Daily Evening Bulletin,
Philadelphia, Sept. 1, 1866.

Joseph Harrison, Jr., Esq.:

Dear Sir:—We have one of your 31 Horse-power Globular, Five-Slabbed Boilers, known as the "Harrison Boiler," in use now nearly five months, and as a safe, reliable steam boiler, and for economy of fuel, we think it cannot be equaled.

We have a ten horse-power engine, running eight hours per day, with an average saving of 50 per cent in the use of fuel over the old-style boiler. Our Engineer, Mr. George Lodge, has had over thirty years' experience in the management of boilers, and he has no hesitation in pronouncing the Harrison Boiler the "Best" he ever worked.

Very respectfully yours,
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Earle Stove Company,
Worcester, Mass., Sept. 3, 1866.

Joseph Harrison, Jr.:

Dear Sir:—Before purchasing your boiler, we examined with much care the various kinds now in use, determined to get "The Best." After eight months' trial, our experience conclusively confirms the correctness of our judgment in making choice of yours. Our President (T. K. Earle), and Treasurer (Edward Earle), who have in their Card Factory, one of the best of tubular boilers, are now putting in one of yours. We refer you to our Engineer, Mr. Frederick Edwards.

Truly yours,
EARLE STOVE CO., SIDNEY SMITH, Supt.

Worcester, Mass., Sept. 3d, 1866.

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EREDERICK EDWARDS, Engineer,
Earle Stove Co., Worcester, Mass.

Worcester, Mass., 9th mo., 6th, 1866.

Joseph Harrison:

Dear Sir:—We received your letter, and in answer will say, we are highly gratified with Boilers. The one we are using at the Earle Stove Co. has been in operation, since the first of the year, in perfect order. We have just got in operation the last sent, at our Card Factory, and are running it beside a Tubular of about the same capacity: so far we find a saving of about one-half by actual measurement.

Truly yours
T. K. EARLE & CO.

Alpine Mills, Howards, Center county, Pa.,
September 8, 1866

Joseph Harrison, Jr., Esq.:

Dear Sir:—It gives me great pleasure to be able to inform you that your Boiler comes up to the most sanguine expectations; in fact, all that you can possibly claim for it: being economical, safe, and a speedy generator of steam. Since they were first put up in the spring (which, by the way, was done without having a mechanic on the ground, except the mason), according to your plans, sent gratis, the first leak, trouble, or delay has yet to make its appearance. Steam is kept up from 75 to 90 lbs. for Wm. H. King's (1015 Sansom street), 25 horse-power Oscillating Engine, with saw dust, there being but a 25-feet iron stack of 2 feet diameter. . . .

I am, dear Sir, yours very respectfully,
PERCY H. WHITE, Agent.

Lincoln Mills,
S. W. cor. 25th and Spruce streets, Philadelphia, Sept. 10, 1866.

Joseph Harrison, Jr., Esq.:

Dear Sir:—In reply to your letter of the 9th ult., I would say that I have been using the "Harrison Boiler" for more than two years, and it gives me great pleasure to state that I find it entirely satisfactory. I have had both Cylinder and Tubular Boilers in use, and have consequently been able to compare each of them with yours. I have two of your boilers of 75 horse-power each in use, and my engine is 70 horse-power. I do not require more than 50 lbs. of steam, but would not hesitate to run up to 250 lbs., if necessary required me to do so. I had each of the slabs tested in my presence to 600 lbs. to the square inch. I know that it requires less fuel than the best of either the Cylinder or Tubular Boilers. My neighbor, with about the same machinery, using the steam for power generally, and heating his Mill with exhaust steam, informs me that he burns four tuns of coal per day under his Cylinder Boiler, while I used less than two tons per day, during the coldest days of last winter, and heated my Mill with live steam, in addition to the amount required for power. The question of durability is one of time. I think that in consequence of the ease with which it can be cleaned or repaired, that it will last far longer than any other kind now in use. It is perfectly safe. There is no danger whatever of explosion. I do not hesitate to recommend it. If I ever need another boiler, I will get one of yours in preference to any other that I now have any knowledge of.

Yours truly,
SAMUEL W. CATTELL.

Superintendent's Office, Camden and Atlantic Railroad,
Camden, N. J., Aug. 21, 1866.

Joseph Harrison, Jr.:

Dear Sir:—You ask our opinion of the safety, economy in fuel, and general merit of the Harrison Boiler we have in use. I deem it a safe Boiler; from its construction I do not think it possible that a disastrous explosion can occur. It is a rapid generator of steam, and requires less fuel than any boiler that has come under my notice. . . . . .

Very respectfully yours,
G. W. N. CUSTIS, Supt.

Philadelphia, Aug. 10, 1866.

Joseph Harrison, Jr., Esq.:

Dear Sir:—Having charge (as administrators) of the Worsted Mills of the late Mr. Samuel Yewdall, at which the recent terrible explosion of a wrought-iron boiler occurred, we have decided to avoid a recurrence of such a calamity in the future, and, believing your Boiler to be the only one absolutely free from danger from explosion, and at the same time equal, if not superior, as a generator of steam, and in economy of fuel, to any boiler now in use. You will please accept our order, to furnish us for said Mills, two fifty horse-power Boilers, to be used separately or in conjunction. By complying quickly with the above order, you will very much oblige,

Yours truly,
JAMES HUNTER, } Administrators.
N. R. SUPLEE, }

Rock Island Manufacturing Company,
Charlotte, N. C., August 23, 1866.

Mr. Joseph Harrison, Jr.:

Dear Sir:—Our experience with your Boiler warrants us in bearing testimony to its superiority over any other with which we are acquainted. Ours is a 100 horse-power boiler, and drives six sets of woolen machinery, and furnishes steam for our dyeing operations, and for heating the mill. Our fuel is wood, and we use three cords per day to do all our work, whereas, we formerly used that quantity under Cylinder Boilers, merely to furnish steam for our dye house, and heating the mill. Our experience is, that in fifteen minutes after applying the fire in the morning, we have on a full head of steam, and our machinery at work. We have had it in use only a few months, it is true, but we presume long enough to test its adaptation to our fuel and our work, and have found it in every respect to come up to your representations. Our Boiler was set up and put to work by a man who never had seen it done, without the the slightest difficulty. Your Boiler commends itself for economy in fuel, and its merits need only to be known to render it universally popular.

Very respectfully yours,
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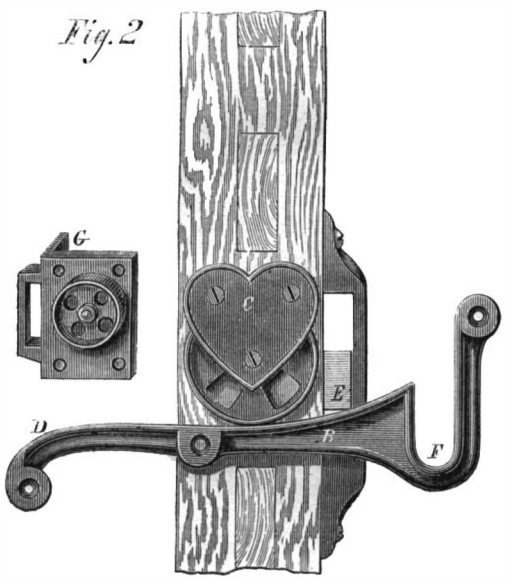
Fig. 1 shows a common occurrence, where a "sagging" gate swung from its fastening gives freedom to a flock of sheep. The gate shown at A, however, performs its office, because equally supported by the hinges and the latch improvement The part, B, Fig. 2, is screwed to the post in a horizontal position, and C, carrying the roller, is secured to the gate at such a hight that, in swinging the gate, the roller engages B at D, which receives the weight of the gate, and sustains it as it is moved to a point where the latch, E, can drop into the recess at F.

Fig. 1

The latch end of the gate is thus always supported, so that there is no danger of leaving the hinge post and displacing the gate. The casting,

Fig. 2



G, with latch guide and roller combined, is for a small gate.

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"The boiler, which is the return flue style, was built at Pittsburgh, and has a shell of about 72 inches diameter. The plates immediately over the furnace, either from excessive pressure of steam alone, or aided by the deposit of scale on their interior surface, which prevented the water from coming in contact with the iron, became considerably bulged outward, and it was while the workmen were engaged in cutting out these defective plates that the accident occurred. They had chipped an opening of several inches at the forward end of one of the sheets, when suddenly the after end tore apart with a tremendous noise; in fact, so loud was the report that the men engaged in the mill rushed to the door exclaiming, 'there goes another powder mill' (one having exploded only a few days before in that vicinity), and it was several minutes before it was discovered that the rupture of the boiler had caused it. One of the men, who was in the act of chipping, and had his hand hold of the chisel which was wedged in the boiler, was so completely paralyzed on one side as to be unable to move, and he was conveyed home, very ill. The rupture took place in one of the transverse seams of the boiler, tearing the solid iron between the rivets about one-sixteenth of an inch apart, and over one foot in length."

From these details it will be seen that the term "boiler explosion" is incorrectly used. One of the crown sheets merely tore from its fastenings, at a time when there was no water, steam, or heat in the boiler. We think that if the cause of this mysterious accident cannot be fully demonstrated, it can be approximately conjectured, at least. First, there is generally in the newspaper accounts of these wonderful occurrences, some gap, which requires a fact to fill, but is often filled by imagination. Second, the bent or "bulged" plates were simply a "strung bow," wanting only an occasion to exert their latent force. They were strained to almost their highest point of tension, and when the violence of the hammering, in cutting one end of a plate, disturbed the conditions of quiet, and released a portion of the latent strain, the sheet gave way at its weakest part, which, in this case, seemed to be the riveted edge. If the "bulging" had not been resisted by the riveted seams, and the mass of the boiler itself, it would have exhibited its effects before, in a pulling away at the seams, and a leaking of the boiler. Third, the paralysis of the workman will be well understood by every machinist who has made a a foul blow while "chipping," the jar of the chisel disabling his hand for a time. Fourth, the only mystery about the affair is the reputed noise of the explosion, which may be mainly imaginary, the workmen who heard it having been alarmed but a few days before by the explosion of a powder mill. We are not informed that any but those employed in the mill heard this boiler explosion.

SALUTES fired in New London harbor by the French frigate *Themis*, were heard distinctly in Norwich, a distance of fourteen miles.

Progress of American Invention.

The best evidence of the progress which this country is making in science and the mechanic arts, is seen in the rapid increase in the number of inventions. Last week five hundred applications for patents were received at the Patent Office in Washington, together with sixty-eight caveats; and it is stated that two hundred and twenty-two patents will be issued this week. When we consider the comparative perfection of mechanics at the present time, it seems as though the whole field of invention has been covered, and that there is but little more to be done. The statistics show, however, that the march of invention is now going on more rapidly than ever before, and the imagination is lost in the attempt to conceive what it may bring forth. The remarkable impetus which has been given to invention within the last few years is doubtless attributable, in a great measure, to the removal of those difficulties which used to beset inventors in the procurement of patents. Messrs. Munn & Co., of this city, through whose agency the patent business is chiefly conducted, have so systematized the business that the inventor now encounters no trouble whatever. Their aim has been to encourage and promote American inventions, and by scrupulous regard for the interest of inventors they have unquestionably done much to produce the results which are now seen. Our country is now far in advance of any other nation in respect to useful inventions, and there is every reason to believe that we shall soon entirely eclipse the old world in the products of our ingenuity.—*New York Sun.*

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